ArcCoth

Notations

Traditional name

Inverse hyperbolic cotangent

Traditional notation

$\coth^{-1}(z)$

Mathematica StandardForm notation

`ArcCoth[z]`

Primary definition

01.28.02.0001.01

$$\coth^{-1}(z) = \frac{1}{2}\left(\log\left(1+\frac{1}{z}\right)-\log\left(1-\frac{1}{z}\right)\right) /; z \neq 0$$

01.28.02.0002.01

$$\coth^{-1}(0) = \frac{i\pi}{2}$$

The function $\coth^{-1}(z)$ can also be defined as the inverse function for coth: $w = \coth^{-1}(z)$ if and only if $\coth(w) = z$.

Specific values

Values at fixed points

01.28.03.0001.01

$$\coth^{-1}(0) = \frac{i\pi}{2}$$

01.28.03.0002.01

$$\coth^{-1}\left(\left(2-\sqrt{3}\right)i\right) = -\frac{5\pi i}{12}$$

01.28.03.0003.01

$$\coth^{-1}\left(\left(\sqrt{3}-2\right)i\right) = \frac{5\pi i}{12}$$

01.28.03.0004.01

$$\coth^{-1}\left(i\sqrt{1-\frac{2}{\sqrt{5}}}\right) == -\frac{2\pi i}{5}$$

01.28.03.0005.01

$$\coth^{-1}\left(-i\sqrt{1-\frac{2}{\sqrt{5}}}\right) == \frac{2\pi i}{5}$$

01.28.03.0006.01

$$\coth^{-1}\left(\left(\sqrt{2}-1\right)i\right) == -\frac{3\pi i}{8}$$

01.28.03.0007.01

$$\coth^{-1}\left(\left(1-\sqrt{2}\right)i\right) == \frac{3\pi i}{8}$$

01.28.03.0008.01

$$\coth^{-1}\left(\frac{i}{\sqrt{3}}\right) == -\frac{\pi i}{3}$$

01.28.03.0009.01

$$\coth^{-1}\left(-\frac{i}{\sqrt{3}}\right) == \frac{\pi i}{3}$$

01.28.03.0010.01

$$\coth^{-1}\left(i\sqrt{5-2\sqrt{5}}\right) == -\frac{3\pi i}{10}$$

01.28.03.0011.01

$$\coth^{-1}\left(-i\sqrt{5-2\sqrt{5}}\right) == \frac{3\pi i}{10}$$

01.28.03.0012.01

$$\coth^{-1}(i) == -\frac{\pi i}{4}$$

01.28.03.0013.01

$$\coth^{-1}(-i) == \frac{\pi i}{4}$$

01.28.03.0014.01

$$\coth^{-1}\left(i\sqrt{1+\frac{2}{\sqrt{5}}}\right) == -\frac{\pi i}{5}$$

01.28.03.0015.01

$$\coth^{-1}\left(-i\sqrt{1+\frac{2}{\sqrt{5}}}\right) == \frac{\pi i}{5}$$

01.28.03.0016.01

$$\coth^{-1}\left(i\sqrt{3}\right) = -\frac{\pi i}{6}$$

01.28.03.0017.01

$$\coth^{-1}\left(-i\sqrt{3}\right) = \frac{\pi i}{6}$$

01.28.03.0018.01

$$\coth^{-1}\left(i\left(1+\sqrt{2}\right)\right) = -\frac{\pi i}{8}$$

01.28.03.0019.01

$$\coth^{-1}\left(-i\left(1+\sqrt{2}\right)\right) = \frac{\pi i}{8}$$

01.28.03.0020.01

$$\coth^{-1}\left(i\sqrt{5+2\sqrt{5}}\right) = -\frac{\pi i}{10}$$

01.28.03.0021.01

$$\coth^{-1}\left(-i\sqrt{5+2\sqrt{5}}\right) = \frac{\pi i}{10}$$

01.28.03.0022.01

$$\coth^{-1}\left(\left(2+\sqrt{3}\right)i\right) = -\frac{\pi i}{12}$$

01.28.03.0023.01

$$\coth^{-1}\left(-\left(2+\sqrt{3}\right)i\right) = \frac{\pi i}{12}$$

01.28.03.0024.01

$$\coth^{-1}(1) = \infty$$

01.28.03.0025.01

$$\coth^{-1}(-1) = -\infty$$

Values at infinities

01.28.03.0026.01

$$\coth^{-1}(\infty) = 0$$

01.28.03.0027.01

$$\coth^{-1}(-\infty) = 0$$

01.28.03.0028.01

$$\coth^{-1}(i\,\infty) = 0$$

01.28.03.0029.01

$$\coth^{-1}(-i\,\infty) = 0$$

01.28.03.0030.01

$$\coth^{-1}(\tilde{\infty}) = 0$$

General characteristics

Domain and analyticity

$\coth^{-1}(z)$ is an analytical function of z, which is defined over the whole complex z-plane.

01.28.04.0001.01

$$z \longrightarrow \coth^{-1}(z) :: \mathbb{C} \longrightarrow \mathbb{C}$$

Symmetries and periodicities

Parity

$\coth^{-1}(z)$ is an odd function.

01.28.04.0002.01

$$\coth^{-1}(-z) = -\coth^{-1}(z)$$

Mirror symmetry

01.28.04.0003.01

$$\coth^{-1}(\bar{z}) = \overline{\coth^{-1}(z)} \;/;\; z \notin (-1, 1)$$

Periodicity

No periodicity

Poles and essential singularities

The function $\coth^{-1}(z)$ has one singular point:
$z = \tilde{\infty}$ is the simple pole with residue -1.

01.28.04.0004.01

$$\mathcal{Sing}_z\left(\coth^{-1}(z)\right) = \{\{\tilde{\infty}, -1\}\}$$

01.28.04.0005.01

$$\operatorname{res}_z\left(\coth^{-1}(z)\right)(\tilde{\infty}) = -1$$

Branch points

The function $\coth^{-1}(z)$ has two branch points: $z = \pm 1$.

01.28.04.0006.01

$$\mathcal{BP}_z\left(\coth^{-1}(z)\right) = \{-1, 1\}$$

01.28.04.0007.01

$$\mathcal{R}_z\left(\coth^{-1}(z), 1\right) = \log$$

01.28.04.0008.01

$$\mathcal{R}_z\left(\coth^{-1}(z), -1\right) = \log$$

Branch cut endpoints

At $z == 0$ two logarithmic branch points coincide in "different" directions: $\coth^{-1}(z) \propto -\frac{\pi}{2} \sqrt{-\frac{1}{z^2}}\, z + O(z) /; (z \to 0)$. This results in $z == 0$ not being a branch point anymore; instead, two disconnected sheets arise.

Branch cuts

The function $\coth^{-1}(z)$ is a single-valued function on the z-plane cut along the intervals $[-1, 0)$ and $(0, 1]$.
The function $\coth^{-1}(z)$ is continuous from below on the interval $[-1, 0)$ and from above on the interval $(0, 1]$.

01.28.04.0009.01

$$\mathcal{BC}_z\left(\coth^{-1}(z)\right) == \{\{(-1, 0], i\}, \{[0, 1), -i\}\}$$

01.28.04.0010.01

$$\lim_{\epsilon \to +0} \coth^{-1}(x - i\,\epsilon) == \coth^{-1}(x) /; -1 < x < 0$$

01.28.04.0011.01

$$\lim_{\epsilon \to +0} \coth^{-1}(x + i\,\epsilon) == \coth^{-1}(x) - i\,\pi /; -1 < x < 0$$

01.28.04.0012.01

$$\lim_{\epsilon \to +0} \coth^{-1}(x + i\,\epsilon) == \coth^{-1}(x) /; 0 < x < 1$$

01.28.04.0013.01

$$\lim_{\epsilon \to +0} \coth^{-1}(x - i\,\epsilon) == \coth^{-1}(x) + i\,\pi /; 0 < x < 1$$

Analytic continuations

The analytic continuation of $\coth^{-1}$ has infinitely many sheets; the values of $\tilde{\coth}^{-1}$ are $\tilde{\coth}^{-1}(z) = \coth^{-1}(z) + i\,k\,\pi \;/; k \in \mathbb{Z}$.

Series representations

Generalized power series

Expansions at generic point $z == z_0$

For the function itself

01.28.06.0019.01

$$\coth^{-1}(z) \propto \coth^{-1}(z_0) - \frac{1}{2}\left\lfloor \frac{\arg(z - z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0}{z_0 - 1}\right) + \log\left(\frac{z_0 - 1}{z_0}\right)\right) + \frac{1}{2}\left\lfloor \frac{\arg(z_0 - z)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0 + 1}{z_0}\right) + \log\left(\frac{z_0}{z_0 + 1}\right)\right) + \frac{z - z_0}{1 - z_0^2} + \frac{z_0\,(z - z_0)^2}{\left(z_0^2 - 1\right)^2} + \ldots /; (z \to z_0)$$

01.28.06.0020.01

$$\coth^{-1}(z) \propto \coth^{-1}(z_0) - \frac{1}{2}\left\lfloor \frac{\arg(z-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0}{z_0-1}\right) + \log\left(\frac{z_0-1}{z_0}\right)\right) + \frac{1}{2}\left\lfloor \frac{\arg(z_0-z)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0+1}{z_0}\right) + \log\left(\frac{z_0}{z_0+1}\right)\right) + \frac{z-z_0}{1-z_0^2} + \frac{z_0\,(z-z_0)^2}{\left(z_0^2-1\right)^2} + O\left((z-z_0)^3\right)$$

01.28.06.0021.01

$$\coth^{-1}(z) = \coth^{-1}(z_0) + \frac{1}{2}\left(-\left\lfloor \frac{\arg(z-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0}{z_0-1}\right) + \log\left(\frac{z_0-1}{z_0}\right)\right) + \left\lfloor \frac{\arg(z_0-z)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0+1}{z_0}\right) + \log\left(\frac{z_0}{z_0+1}\right)\right) + \sum_{k=1}^{\infty} \frac{1}{k\left(1-z_0^2\right)^k} \sum_{j=0}^{n} \binom{k}{j} \left(1+(-1)^{j+k-1}\right) z_0^j\,(z-z_0)^k\right)$$

01.28.06.0022.01

$$\coth^{-1}(z) = \coth^{-1}(z_0) + \frac{1}{2}\left(-\left\lfloor \frac{\arg(z-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0}{z_0-1}\right) + \log\left(\frac{z_0-1}{z_0}\right)\right) + \left\lfloor \frac{\arg(z_0-z)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0+1}{z_0}\right) + \log\left(\frac{z_0}{z_0+1}\right)\right) + \sum_{k=1}^{\infty} \frac{\left((1-z_0)^{-k} + (-1)^{k-1}\,(z_0+1)^{-k}\right)}{k}\,(z-z_0)^k\right)$$

01.28.06.0023.01

$$\coth^{-1}(z) \propto \coth^{-1}(z_0) - \frac{1}{2}\left\lfloor \frac{\arg(z-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0}{z_0-1}\right) + \log\left(\frac{z_0-1}{z_0}\right)\right) + \frac{1}{2}\left\lfloor \frac{\arg(z_0-z)}{2\pi} \right\rfloor \left(\log\left(\frac{z_0+1}{z_0}\right) + \log\left(\frac{z_0}{z_0+1}\right)\right) + O(z-z_0)$$

Expansions on branch cuts

For the function itself

In the left half-plane

01.28.06.0024.01

$$\coth^{-1}(z) \propto \coth^{-1}(x) + i\,\pi \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor + \frac{1}{1-x^2}\,(z-x) + \frac{x}{\left(x^2-1\right)^2}\,(z-x)^2 + \ldots \;/;\; (z \to x) \land x \in \mathbb{R} \land -1 < x < 0$$

01.28.06.0025.01

$$\coth^{-1}(z) \propto \coth^{-1}(x) + i\,\pi \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor + \frac{1}{1-x^2}\,(z-x) + \frac{x}{\left(x^2-1\right)^2}\,(z-x)^2 + O\left((z-x)^3\right) \;/;\; x \in \mathbb{R} \land -1 < x < 0$$

01.28.06.0026.01

$$\coth^{-1}(z) = \coth^{-1}(x) + i\,\pi \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor + \frac{1}{2} \sum_{k=1}^{\infty} \frac{1}{k\left(1-x^2\right)^k} \sum_{j=0}^{n} \binom{k}{j} \left(1+(-1)^{j+k-1}\right) x^j\,(z-x)^k \;/;\; x \in \mathbb{R} \land -1 < x < 0$$

01.28.06.0027.01

$$\coth^{-1}(z) = \coth^{-1}(x) + i\,\pi \left\lfloor \frac{\arg(x-z)}{2\pi} \right\rfloor + \frac{1}{2} \sum_{k=1}^{\infty} \frac{(1-x)^{-k} + (-1)^{k-1}\,(x+1)^{-k}}{k}\,(z-x)^k \;/;\; x \in \mathbb{R} \land -1 < x < 0$$

01.28.06.0028.01

$$\coth^{-1}(z) \propto \coth^{-1}(x) + i\,\pi \left\lfloor \frac{\arg(x-z)}{2\,\pi} \right\rfloor + O(z-x) \;/;\; x \in \mathbb{R} \land -1 < x < 0$$

In the right half-plane

01.28.06.0029.01

$$\coth^{-1}(z) \propto \coth^{-1}(x) - i\,\pi \left\lfloor \frac{\arg(z-x)}{2\,\pi} \right\rfloor + \frac{1}{1-x^2}\,(z-x) + \frac{x}{\left(x^2-1\right)^2}\,(z-x)^2 + \ldots \;/;\; (z \to x) \land x \in \mathbb{R} \land 0 < x < 1$$

01.28.06.0030.01

$$\coth^{-1}(z) \propto \coth^{-1}(x) - i\,\pi \left\lfloor \frac{\arg(z-x)}{2\,\pi} \right\rfloor + \frac{1}{1-x^2}\,(z-x) + \frac{x}{\left(x^2-1\right)^2}\,(z-x)^2 + O\!\left((z-x)^3\right) \;/;\; x \in \mathbb{R} \land 0 < x < 1$$

01.28.06.0031.01

$$\coth^{-1}(z) = \coth^{-1}(x) - i\,\pi \left\lfloor \frac{\arg(z-x)}{2\,\pi} \right\rfloor + \frac{1}{2} \sum_{k=1}^{\infty} \frac{1}{k\left(1-x^2\right)^k} \sum_{j=0}^{n} \binom{k}{j} \left(1 + (-1)^{j+k-1}\right) x^j\,(z-x)^k \;/;\; x \in \mathbb{R} \land 0 < x < 1$$

01.28.06.0032.01

$$\coth^{-1}(z) = \coth^{-1}(x) - i\,\pi \left\lfloor \frac{\arg(z-x)}{2\,\pi} \right\rfloor + \frac{1}{2} \sum_{k=1}^{\infty} \frac{(1-x)^{-k} + (-1)^{k-1}\,(x+1)^{-k}}{k}\,(z-x)^k \;/;\; x \in \mathbb{R} \land 0 < x < 1$$

01.28.06.0033.01

$$\coth^{-1}(z) \propto \coth^{-1}(x) - i\,\pi \left\lfloor \frac{\arg(z-x)}{2\,\pi} \right\rfloor + O(z-x) \;/;\; x \in \mathbb{R} \land 0 < x < 1$$

Expansions at $z = 0$

For the function itself

01.28.06.0001.02

$$\coth^{-1}(z) \propto -\frac{\pi}{2} \sqrt{-\frac{1}{z^2}}\; z + z + \frac{z^3}{3} + \frac{z^5}{5} + \ldots \;/;\; (z \to 0)$$

01.28.06.0034.01

$$\coth^{-1}(z) \propto -\frac{\pi}{2} \sqrt{-\frac{1}{z^2}}\; z + z + \frac{z^3}{3} + \frac{z^5}{5} + O\!\left(z^7\right)$$

01.28.06.0002.01

$$\coth^{-1}(z) = -\frac{\pi}{2} \sqrt{-\frac{1}{z^2}}\; z + \sum_{k=0}^{\infty} \frac{z^{2k+1}}{2\,k+1} \;/;\; |z| < 1$$

01.28.06.0003.01

$$\coth^{-1}(z) = -\frac{\pi}{2} \sqrt{-\frac{1}{z^2}}\; z + z\; {}_2F_1\!\left(\frac{1}{2}, 1; \frac{3}{2}; z^2\right) \;/;\; z \notin (-\infty, -1) \bigwedge z \notin (1, \infty)$$

01.28.06.0004.02

$$\coth^{-1}(z) \propto -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\ z + z + O(z^3)$$

01.28.06.0035.01

$$\coth^{-1}(z) \propto \begin{cases} -\frac{i\pi}{2} & 0 \le \arg(z) < \pi \\ \frac{i\pi}{2} & \text{True} \end{cases} \ /;\ (z \to 0)$$

01.28.06.0036.01

$$\coth^{-1}(z) == F_\infty(z)\ /;\ \left(\left(F_n(z) == -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\ z + \sum_{k=0}^{n}\frac{z^{2k+1}}{2k+1} == \coth^{-1}(z) - \frac{z^{2n+3}}{2n+3}\ {}_2F_1\left(1, n+\frac{3}{2}; n+\frac{5}{2}; z^2\right)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For small integer powers of the function

For the second power

01.28.06.0037.01

$$\coth^{-1}(z)^2 \propto -\frac{\pi^2}{4} - \pi\, z^2\sqrt{-\frac{1}{z^2}}\left(1 + \frac{z^2}{3} + \frac{z^4}{5} + \ldots\right) + z^2\left(1 + \frac{2z^2}{3} + \frac{23z^4}{45} + \ldots\right)\ /;\ (z \to 0)$$

01.28.06.0038.01

$$\coth^{-1}(z)^2 \propto -\frac{\pi^2}{4} - \pi\, z^2\sqrt{-\frac{1}{z^2}}\left(1 + \frac{z^2}{3} + \frac{z^4}{5} + O(z^6)\right) + z^2\left(1 + \frac{2z^2}{3} + \frac{23z^4}{45} + O(z^6)\right)$$

01.28.06.0039.01

$$\coth^{-1}(z)^2 == -\frac{\pi^2}{4} - \pi\, z^2\sqrt{-\frac{1}{z^2}}\left(\sum_{k=0}^{\infty}\frac{z^{2k}}{2k+1}\right) + z^2\left(\sum_{k=0}^{\infty}\frac{z^{2k}}{2k+1}\right)^2\ /;\ |z| < 1$$

01.28.06.0040.01

$$\coth^{-1}(z)^2 == \tanh^{-1}(z)^2 - \pi\sqrt{-\frac{1}{z^2}}\ z\tanh^{-1}(z) - \frac{\pi^2}{4}\ /;\ z \notin (-\infty, -1) \bigwedge z \notin (1, \infty)$$

01.28.06.0041.01

$$\coth^{-1}(z)^2 == -\frac{\pi^2}{4} - \pi\, z^2\sqrt{-\frac{1}{z^2}}\ {}_2F_1\left(\frac{1}{2}, 1; \frac{3}{2}; z^2\right) + z^2\ {}_2F_1\left(\frac{1}{2}, 1; \frac{3}{2}; z^2\right)^2\ /;\ z \notin (-\infty, -1) \bigwedge z \notin (1, \infty)$$

01.28.06.0042.01

$$\coth^{-1}(z)^2 \propto -\frac{\pi^2}{4} - \pi\sqrt{-\frac{1}{z^2}}\ z^2\left(1 + O(z^2)\right) + z^2\left(1 + O(z^2)\right)$$

01.28.06.0043.01

$$\coth^{-1}(z)^2 \propto -\frac{\pi^2}{4} \;/;\; (z \to 0)$$

01.28.06.0044.01

$$\coth^{-1}(z)^2 == F_\infty(z) \;/;\; \left(\left(F_n(z) == -\frac{\pi^2}{4} - \pi z^2 \sqrt{-\frac{1}{z^2}} \sum_{k=0}^{n} \frac{z^{2k}}{2k+1} + z^2 \left(\sum_{k=0}^{n} \frac{z^{2k}}{2k+1}\right)^2 == \left(\coth^{-1}(z) - \frac{z^{2n+3}}{2n+3}\, {}_2F_1\!\left(1, n+\frac{3}{2}; n+\frac{5}{2}; z^2\right)\right)^2\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

Expansions at $z == 1$

For the function itself

01.28.06.0005.02

$$\coth^{-1}(z) \propto \frac{1}{2}\left(\log(2) - \log(z-1) + \frac{z-1}{2} - \frac{1}{8}(z-1)^2 + \ldots\right) \;/;\; (z \to 1)$$

01.28.06.0045.01

$$\coth^{-1}(z) \propto \frac{1}{2}\left(\log(2) - \log(z-1) + \frac{z-1}{2} - \frac{1}{8}(z-1)^2 + O\!\left((z-1)^3\right)\right)$$

01.28.06.0006.01

$$\coth^{-1}(z) == \frac{1}{2}\left(\log(2) - \log(z-1) - \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k (z-1)^k}{k}\right) \;/;\; |z-1| < 2$$

01.28.06.0007.01

$$\coth^{-1}(z) == \frac{\log(2)}{2} - \frac{1}{2}\log(z-1) + \frac{z-1}{4}\, {}_2F_1\!\left(1, 1; 2; \frac{1-z}{2}\right) \;/;\; z \notin (-1, 0)$$

01.28.06.0008.02

$$\coth^{-1}(z) \propto \frac{\log(2)}{2} - \frac{1}{2}\log(z-1) + \frac{z-1}{4} + O\!\left((z-1)^2\right)$$

01.28.06.0046.01

$$\coth^{-1}(z) == F_\infty(z) \;/;\; \left(\left(F_n(z) == \frac{\log(2)}{2} - \frac{1}{2}\log(z-1) + \frac{1}{4}(z-1) \sum_{k=0}^{n} \frac{\left(-\frac{1}{2}\right)^k (z-1)^k}{k+1} == \frac{2^{-n-3}(1-z)^{n+2}}{n+2}\, {}_2F_1\!\left(1, n+2; n+3; \frac{1-z}{2}\right) - \frac{1}{2}\log(z-1) + \frac{1}{2}\log(z+1)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For small integer powers of the function

For the second power

01.28.06.0047.01

$$\coth^{-1}(z)^2 \propto \frac{1}{4}\log^2\left(\frac{z-1}{2}\right) - \frac{z-1}{4}\log\left(\frac{z-1}{2}\right)\left(1 - \frac{z-1}{4} + \frac{(z-1)^2}{12} + \ldots\right) + \frac{(z-1)^2}{16}\left(1 - \frac{z-1}{2} + \frac{11}{48}(z-1)^2 + \ldots\right) /; (z \to 1)$$

01.28.06.0048.01

$$\coth^{-1}(z)^2 \propto \frac{1}{4}\log^2\left(\frac{z-1}{2}\right) - \frac{z-1}{4}\log\left(\frac{z-1}{2}\right)\left(1 - \frac{z-1}{4} + \frac{(z-1)^2}{12} + O\left((z-1)^3\right)\right) + \frac{(z-1)^2}{16}\left(1 - \frac{z-1}{2} + \frac{11}{48}(z-1)^2 + O\left((z-1)^3\right)\right)$$

01.28.06.0049.01

$$\coth^{-1}(z)^2 = \frac{1}{4}\log^2\left(\frac{z-1}{2}\right) - \frac{z-1}{4}\log\left(\frac{z-1}{2}\right)\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k (z-1)^k}{k+1}\right) + \frac{(z-1)^2}{16}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k (z-1)^k}{k+1}\right)^2 /; |z-1| < 2$$

01.28.06.0050.01

$$\coth^{-1}(z)^2 = \frac{1}{4}\log^2\left(\frac{z-1}{2}\right) - \frac{z-1}{4}\log\left(\frac{z-1}{2}\right) {}_2F_1\left(1, 1; 2; \frac{1-z}{2}\right) + \frac{(z-1)^2}{16}\ {}_2F_1\left(1, 1; 2; \frac{1-z}{2}\right)^2 /; z \notin (-1, 0)$$

01.28.06.0051.01

$$\coth^{-1}(z)^2 \propto \frac{1}{4}\log^2\left(\frac{z-1}{2}\right) - \frac{z-1}{4}\log\left(\frac{z-1}{2}\right)(1 + O(z-1)) + \frac{(z-1)^2}{16}(1 + O(z-1))$$

01.28.06.0052.01

$$\coth^{-1}(z)^2 = F_\infty(z) /; \left(\left(F_n(z) = \frac{1}{4}\log^2\left(\frac{z-1}{2}\right) - \frac{z-1}{4}\log\left(\frac{z-1}{2}\right)\sum_{k=0}^{n}\left(-\frac{1}{2}\right)^k \frac{(z-1)^k}{k+1} + \frac{(z-1)^2}{16}\left(\sum_{k=0}^{n}\left(-\frac{1}{2}\right)^k \frac{(z-1)^k}{k+1}\right)^2 = \left(\frac{2^{-n-3}(1-z)^{n+2}}{n+2}\, {}_2F_1\left(1, n+2; n+3; \frac{1-z}{2}\right) - \frac{1}{2}\log(z-1) + \frac{1}{2}\log(z+1)\right)^2\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

Expansions at $z = -1$

For the function itself

01.28.06.0009.02

$$\coth^{-1}(z) \propto \frac{1}{2}\left(-\log(2) + \log(-z-1) + \frac{z+1}{2} + \frac{1}{8}(z+1)^2 + \ldots\right) /; (z \to -1)$$

01.28.06.0053.01

$$\coth^{-1}(z) \propto \frac{1}{2}\left(-\log(2) + \log(-z-1) + \frac{z+1}{2} + \frac{1}{8}(z+1)^2 + O\left((z+1)^3\right)\right)$$

01.28.06.0010.01

$$\coth^{-1}(z) = \frac{1}{2}\left(-\log(2) + \log(-z-1) + \sum_{k=1}^{\infty}\frac{2^{-k}(z+1)^k}{k}\right) /; |z+1| < 2$$

01.28.06.0011.01

$$\coth^{-1}(z) = -\frac{\log(2)}{2} + \frac{1}{2}\log(-z-1) + \frac{1}{4}(z+1)\, {}_2F_1\left(1, 1; 2; \frac{z+1}{2}\right) /; z \notin (0, 1)$$

01.28.06.0012.02

$$\coth^{-1}(z) \propto -\frac{\log(2)}{2} + \frac{1}{2}\log(-z-1) + \frac{z+1}{4} + O\left((z+1)^2\right)$$

01.28.06.0054.01

$$\coth^{-1}(z) = F_\infty(z) /; \left(\left(F_n(z) = -\frac{\log(2)}{2} + \frac{1}{2}\log(-z-1) + \frac{z+1}{4}\sum_{k=0}^{n}\frac{2^{-k}(z+1)^k}{k+1} = -\frac{2^{-n-3}(1+z)^{n+2}}{n+2}\,{}_2F_1\left(1, n+2; n+3; \frac{z+1}{2}\right) + \frac{1}{2}\log(-z-1) + \frac{1}{2}\log(1-z)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For small integer powers of the function

For the second power

01.28.06.0055.01

$$\coth^{-1}(z)^2 \propto \frac{1}{4}\log^2\left(-\frac{z+1}{2}\right) + \frac{z+1}{4}\log\left(-\frac{z+1}{2}\right)\left(1 + \frac{z+1}{4} + \frac{(z+1)^2}{12} + \dots\right) + \frac{(z+1)^2}{16}\left(1 + \frac{z+1}{2} + \frac{11}{48}(z+1)^2 + \dots\right) /; (z \to -1)$$

01.28.06.0056.01

$$\coth^{-1}(z)^2 \propto \frac{1}{4}\log^2\left(-\frac{z+1}{2}\right) + \frac{z+1}{4}\log\left(-\frac{z+1}{2}\right)\left(1 + \frac{z+1}{4} + \frac{(z+1)^2}{12} + O\left((z+1)^3\right)\right) + \frac{(z+1)^2}{16}\left(1 + \frac{z+1}{2} + \frac{11}{48}(z+1)^2 + O\left((z+1)^3\right)\right)$$

01.28.06.0057.01

$$\coth^{-1}(z)^2 = \frac{1}{4}\log^2\left(-\frac{z+1}{2}\right) + \frac{z+1}{4}\log\left(-\frac{z+1}{2}\right)\sum_{k=0}^{\infty}\frac{(z+1)^k}{2^k(k+1)} + \frac{(z+1)^2}{16}\left(\sum_{k=0}^{\infty}\frac{(z+1)^k}{2^k(k+1)}\right)^2 /; |z+1| < 2$$

01.28.06.0058.01

$$\coth^{-1}(z)^2 = \frac{1}{4}\log^2\left(-\frac{z+1}{2}\right) + \frac{z+1}{4}\log\left(-\frac{z+1}{2}\right){}_2F_1\left(1, 1; 2; \frac{z+1}{2}\right) + \frac{(z+1)^2}{16}\,{}_2F_1\left(1, 1; 2; \frac{z+1}{2}\right)^2 /; z \notin (0, 1)$$

01.28.06.0059.01

$$\coth^{-1}(z)^2 \propto \frac{1}{4}\log^2\left(-\frac{z+1}{2}\right) + \frac{z+1}{4}\log\left(-\frac{z+1}{2}\right)(1 + O(z+1)) + \frac{(z+1)^2}{16}(1 + O(z+1))$$

01.28.06.0060.01

$$\coth^{-1}(z)^2 = F_\infty(z) /; \left(\left(F_n(z) = \frac{1}{4}\log^2\left(\frac{z-1}{2}\right) - \frac{z-1}{4}\log\left(\frac{z-1}{2}\right)\sum_{k=0}^{n}\left(-\frac{1}{2}\right)^k\frac{(z-1)^k}{k+1} + \frac{(z-1)^2}{16}\left(\sum_{k=0}^{n}\left(-\frac{1}{2}\right)^k\frac{(z-1)^k}{k+1}\right)^2 = \left(\frac{2^{-n-3}(1-z)^{n+2}}{n+2}\,{}_2F_1\left(1, n+2; n+3; \frac{1-z}{2}\right) - \frac{1}{2}\log(z-1) + \frac{1}{2}\log(z+1)\right)^2\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

Expansions at $z = \infty$

For the function itself

01.28.06.0013.02

$$\coth^{-1}(z) \propto \frac{1}{z} + \frac{1}{3z^3} + \frac{1}{5z^5} + \ldots \;/;\; |z| \to \infty$$

01.28.06.0061.01

$$\coth^{-1}(z) \propto \frac{1}{z} + \frac{1}{3z^3} + \frac{1}{5z^5} + O\left(\frac{1}{z^7}\right)$$

01.28.06.0014.01

$$\coth^{-1}(z) == \sum_{k=0}^{\infty} \frac{z^{-2k-1}}{2k+1} \;/;\; |z| > 1$$

01.28.06.0015.01

$$\coth^{-1}(z) == \frac{1}{z}\, {}_2F_1\left(\frac{1}{2}, 1; \frac{3}{2}; \frac{1}{z^2}\right)$$

01.28.06.0016.02

$$\coth^{-1}(z) \propto \frac{1}{z} + O\left(\frac{1}{z^3}\right)$$

01.28.06.0062.01

$$\coth^{-1}(z) == F_\infty(z) \;/;\; \left(\left(F_n(z) == \frac{1}{z}\sum_{k=0}^{n} \frac{z^{-2k}}{2k+1} == \coth^{-1}(z) - \frac{z^{-2n-3}}{2n+3}\, {}_2F_1\left(1, n+\frac{3}{2}; n+\frac{5}{2}; \frac{1}{z^2}\right)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For small integer powers of the function

For the second power

01.28.06.0063.01

$$\coth^{-1}(z)^2 \propto \frac{1}{z^2}\left(1 + \frac{2}{3z^2} + \frac{23}{45z^4} + \ldots\right) /;\; |z| \to \infty$$

01.28.06.0064.01

$$\coth^{-1}(z)^2 \propto \frac{1}{z^2}\left(1 + \frac{2}{3z^2} + \frac{23}{45z^4} + O\left(\frac{1}{z^6}\right)\right)$$

01.28.06.0065.01

$$\coth^{-1}(z)^2 == \frac{1}{z^2}\left(\sum_{k=0}^{\infty} \frac{z^{-2k}}{2k+1}\right)^2 /;\; |z| > 1$$

01.28.06.0066.01

$$\coth^{-1}(z)^2 == \frac{1}{z^2}\, {}_2F_1\left(1, \frac{1}{2}; \frac{3}{2}; \frac{1}{z^2}\right)^2$$

01.28.06.0067.01

$$\coth^{-1}(z)^2 \propto \frac{1}{z^2}\left(1 + O\left(\frac{1}{z^2}\right)\right)$$

01.28.06.0068.01

$$\coth^{-1}(z)^2 = F_\infty(z) /; \left(\left(F_n(z) = \frac{1}{z^2}\left(\sum_{k=0}^{n} \frac{z^{-2k}}{2k+1}\right)^2 = \left(\coth^{-1}(z) - \frac{z^{-2n-3}}{2n+3}\, {}_2F_1\left(1, n+\frac{3}{2}; n+\frac{5}{2}; \frac{1}{z^2}\right)\right)^2\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

Residue representations

01.28.06.0017.01

$$\coth^{-1}(z) = -\frac{1}{2z}\left(\sum_{j=0}^{\infty} \mathrm{res}_s\left(\frac{\Gamma(s)\,\Gamma(1-s)\left(-\frac{1}{z^2}\right)^{-s}}{\Gamma\left(\frac{3}{2}-s\right)}\,\Gamma\left(\frac{1}{2}-s\right)\right)\left(\frac{1}{2}+j\right) + \sum_{j=0}^{\infty} \mathrm{res}_s\left(\frac{\Gamma(s)\,\Gamma\left(\frac{1}{2}-s\right)\left(-\frac{1}{z^2}\right)^{-s}}{\Gamma\left(\frac{3}{2}-s\right)}\,\Gamma(1-s)\right)(1+j)\right) /; |z| < 1$$

01.28.06.0018.01

$$\coth^{-1}(z) = \frac{1}{2z}\sum_{j=0}^{\infty} \mathrm{res}_s\left(\frac{\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\left(-\frac{1}{z^2}\right)^{-s}}{\Gamma\left(\frac{3}{2}-s\right)}\,\Gamma(s)\right)(-j) /; |z| > 1$$

Integral representations

On the real axis

Of the direct function

01.28.07.0001.01

$$\coth^{-1}(z) = z\int_1^\infty \frac{1}{z^2 t^2 - 1}\,dt /; \mathrm{Im}(z) > 0 \lor \mathrm{Im}(z) = 0 \land 0 < z < 1 \lor \mathrm{Im}(z) = 0 \land z < -1$$

01.28.07.0002.01

$$\coth^{-1}(z) = z\int_{-\infty}^1 \frac{1}{z^2 t^2 - 1}\,dt /; \mathrm{Im}(z) > 0 \lor \mathrm{Im}(z) = 0 \land 0 < z < 1 \lor \mathrm{Im}(z) = 0 \land z < -1$$

Contour integral representations

01.28.07.0003.01

$$\coth^{-1}(z) = \frac{1}{4\pi i z}\int_{\mathcal{L}} \frac{\Gamma(s)\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)}{\Gamma\left(\frac{3}{2}-s\right)}\left(-\frac{1}{z^2}\right)^{-s} ds /; \left|\arg\left(-z^{-2}\right)\right| < \pi$$

01.28.07.0004.01

$$\coth^{-1}(z) = -\frac{i}{4\pi^{3/2} z}\int_{\mathcal{L}} \Gamma(s)^2\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\left(1-\frac{1}{z^2}\right)^{-s} ds /; \left|\arg\left(1-z^{-2}\right)\right| < \pi$$

01.28.07.0005.01

$$\coth^{-1}(z) = \frac{1}{4\pi i z}\int_{\gamma-i\infty}^{\gamma+i\infty} \frac{\Gamma(s)\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)}{\Gamma\left(\frac{3}{2}-s\right)}\left(-\frac{1}{z^2}\right)^{-s} ds /; 0 < \gamma < \frac{1}{2} \bigwedge \left|\arg\left(-z^{-2}\right)\right| < \pi$$

01.28.07.0006.01

$$\coth^{-1}(z) = -\frac{i}{4\pi^{3/2} z}\int_{\gamma-i\infty}^{\gamma+i\infty} \Gamma(s)^2\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\left(1-\frac{1}{z^2}\right)^{-s} ds /; 0 < \gamma < \frac{1}{2} \bigwedge \left|\arg\left(1-z^{-2}\right)\right| < \pi$$

Continued fraction representations

01.28.10.0001.01

$$\coth^{-1}(z) = \cfrac{z^{-1}}{1 - \cfrac{z^{-2}}{3 - \cfrac{4z^{-2}}{5 - \cfrac{9z^{-2}}{7 - \cfrac{16z^{-2}}{9 - \cfrac{25z^{-2}}{11 - \cfrac{36z^{-2}}{13 - \ldots}}}}}}} \;/;\; z \notin (-1, 1)$$

01.28.10.0002.01

$$\coth^{-1}(z) = \frac{1}{z\left(1 + \mathrm{K}_k\left(-\frac{k^2}{z^2}, 2k+1\right)_1^{\infty}\right)} \;/;\; z \notin (-1, 1)$$

01.28.10.0003.01

$$\coth^{-1}(z) = \frac{1}{z} + \cfrac{z^{-3}}{3 - \cfrac{9z^{-2}}{5 - \cfrac{4z^{-2}}{7 - \cfrac{25z^{-2}}{9 - \cfrac{16z^{-2}}{11 - \cfrac{49z^{-2}}{13 - \cfrac{36z^{-2}}{15 - \ldots}}}}}}} \;/;\; z \notin (-1, 1)$$

01.28.10.0004.01

$$\coth^{-1}(z) = \frac{1}{z} + \frac{1}{z^3\left(3 + \mathrm{K}_k\left(-\frac{\left(k-(-1)^k+1\right)^2}{z^2}, 2k+3\right)_1^{\infty}\right)} \;/;\; z \notin (-1, 1)$$

Differential equations

Ordinary linear differential equations and wronskians

For the direct function itself

01.28.13.0001.01

$$\left(1 - z^2\right) w'(z) = 1 \;/;\; w(z) = \coth^{-1}(z) \bigwedge w(-i) = \frac{i\pi}{4}$$

Transformations

Transformations and argument simplifications

Argument involving basic arithmetic operations

Involving $\coth^{-1}(-z)$

Involving $\coth^{-1}(-z)$ and $\coth^{-1}(z)$

01.28.16.0001.01

$$\coth^{-1}(-z) = -\coth^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$ and $\coth^{-1}(z)$

01.28.16.0017.01

$$\coth^{-1}\left(\frac{1}{z}\right) = \frac{\pi i}{2} + \coth^{-1}(z) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0018.01

$$\coth^{-1}\left(\frac{1}{z}\right) = -\frac{\pi i}{2} + \coth^{-1}(z) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0019.01

$$\coth^{-1}\left(\frac{1}{z}\right) = \coth^{-1}(z) - \frac{\pi \sqrt{-z^2}}{2 z} /; z \notin (-1, 1)$$

01.28.16.0020.01

$$\coth^{-1}\left(\frac{1}{z}\right) = \coth^{-1}(z) + \frac{\pi i}{2} \operatorname{sgn}(\operatorname{Im}(z)) /; \operatorname{Im}(z) \neq 0$$

01.28.16.0021.01

$$\coth^{-1}\left(\frac{1}{z}\right) = \coth^{-1}(z) + \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} \sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.16.0022.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} + \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0023.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} + \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.16.0024.01

$$\coth^{-1}\left(\sqrt{z}\right) = \coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.16.0025.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} + \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0026.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} + \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.16.0027.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} - \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.16.0028.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{z}\sqrt{\frac{1}{z}}\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\coth^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right)$

01.28.16.0029.01

$$\coth^{-1}\left(\sqrt{z}\right) = \coth^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi$$

01.28.16.0030.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\coth^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.16.0031.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{z}\sqrt{\frac{1}{z}}\coth^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\coth^{-1}\left(\sqrt{z}\right)$

01.28.16.0032.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \coth^{-1}\left(\sqrt{z}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0033.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{2} + \coth^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.16.0034.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \coth^{-1}\left(\sqrt{z}\right) - \frac{\pi \sqrt{1-z}}{2\sqrt{z-1}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.16.0035.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi$$

01.28.16.0036.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.16.0037.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z}\sqrt{\frac{1}{z}} \coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\coth^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right)$

01.28.16.0038.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \coth^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0039.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{2} + \coth^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.16.0040.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - \coth^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.16.0041.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z}\sqrt{\frac{1}{z}} \coth^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) - \frac{\pi \sqrt{1-z}}{2\sqrt{z-1}}$$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$ and $\coth^{-1}(z)$

01.28.16.0042.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \coth^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.16.0043.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\coth^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.16.0006.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \coth^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0044.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\pi i}{2} + \coth^{-1}\left(\frac{1}{z}\right) \;/;\; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.16.0045.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi i}{2} + \coth^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.16.0046.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi i}{2} - \coth^{-1}\left(\frac{1}{z}\right) \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \wedge z < -1)$$

01.28.16.0047.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\pi i}{2} - \coth^{-1}\left(\frac{1}{z}\right) \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.28.16.0048.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi \sqrt{-z-1} \sqrt{z-1} \sqrt{-z^2}}{2 \sqrt{z^2 - z^4}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right)$ and $\coth^{-1}(z)$

01.28.16.0139.01

$$\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right) = \frac{\pi i}{2} + \coth^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee z \in \mathbb{R} \land 0 < z < 1 \bigvee \frac{\pi}{2} \leq \arg(z) \leq \pi \bigwedge |z| > 1$$

01.28.16.0140.01

$$\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right) = -\frac{1}{2}(\pi i) + \coth^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee z \in \mathbb{R} \land z > 1 \bigvee -\pi < \arg(z) < -\frac{\pi}{2} \bigwedge |z| > 1$$

01.28.16.0141.01

$$\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right) = -\frac{1}{2}(\pi i) - \coth^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) < \pi \bigwedge |z| < 1$$

01.28.16.0142.01

$$\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right) = \frac{\pi i}{2} - \coth^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigwedge |z| < 1 \bigvee z \in \mathbb{R} \land -1 < z < 0$$

01.28.16.0143.01

$$\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right) = z \sqrt{\frac{1}{z^2}} \coth^{-1}(z) + \frac{\pi \sqrt{z^2}}{2 \sqrt{1 - z^2}} \sqrt{z^2 - 1} \sqrt{\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0144.01

$$\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right) = \coth^{-1}\left(\frac{1}{z}\right) /; |z| > 1 \bigvee |z| < 1 \bigwedge -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.28.16.0145.01

$$\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right) = -\coth^{-1}\left(\frac{1}{z}\right) /; |z| < 1 \bigwedge \left(\frac{\pi}{2} \leq \arg(z) \leq \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2}\right)$$

01.28.16.0146.01

$$\coth^{-1}\left(\sqrt{\frac{1}{z^2}}\right) = z \sqrt{\frac{1}{z^2}} \coth^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(a\left(b z^c\right)^m\right)$

Involving $\coth^{-1}(a (b z^c)^m)$ and $\coth^{-1}(a b^m z^{m c})$

01.28.16.0002.01

$$\coth^{-1}(a\,(b\,z^c)^m) = \frac{(b\,z^c)^m}{b^m\,z^{m\,c}}\coth^{-1}(a\,b^m\,z^{m\,c})\;/;\;2\,m\in\mathbb{Z}$$

Involving $\coth^{-1}\left(\frac{2z}{1+z^2}\right)$

Involving $\coth^{-1}\left(\frac{2z}{1+z^2}\right)$ and $\coth^{-1}(z)$

01.28.16.0049.01

$$\coth^{-1}\left(\frac{2\,z}{1+z^2}\right) = 2\coth^{-1}(z)+\frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z)>0\lor(z\in\mathbb{R}\land z<-1)\lor(z\in\mathbb{R}\land 0<z<1)$$

01.28.16.0050.01

$$\coth^{-1}\left(\frac{2\,z}{1+z^2}\right) = 2\coth^{-1}(z)-\frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z)<0\lor(z\in\mathbb{R}\land z>1)\lor(z\in\mathbb{R}\land -1<z<0)$$

01.28.16.0003.02

$$\coth^{-1}\left(\frac{2\,z}{1+z^2}\right) = 2\coth^{-1}(z)+\frac{\pi\,z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\frac{2z}{1+z^2}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0051.01

$$\coth^{-1}\left(\frac{2\,z}{1+z^2}\right) = 2\coth^{-1}\left(\frac{1}{z}\right)-\frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z)>0\lor(z\in\mathbb{R}\land z<-1)\lor(z\in\mathbb{R}\land 0<z<1)$$

01.28.16.0052.01

$$\coth^{-1}\left(\frac{2\,z}{1+z^2}\right) = 2\coth^{-1}\left(\frac{1}{z}\right)+\frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z)<0\lor(z\in\mathbb{R}\land z>1)\lor(z\in\mathbb{R}\land -1<z<0)$$

01.28.16.0053.01

$$\coth^{-1}\left(\frac{2\,z}{1+z^2}\right) = 2\coth^{-1}\left(\frac{1}{z}\right)-\frac{\pi\,z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$ and $\coth^{-1}(z)$

01.28.16.0054.01

$$\coth^{-1}\left(\frac{1+z^2}{2\,z}\right) = \pi\,i+2\coth^{-1}(z)\;/;\;|z|<1\bigwedge 0\le\arg(z)<\pi$$

01.28.16.0055.01

$$\coth^{-1}\left(\frac{1+z^2}{2\,z}\right) = -\pi\,i+2\coth^{-1}(z)\;/;\;|z|<1\bigwedge -\pi<\arg(z)<0\bigvee(z\in\mathbb{R}\land -1<z<0)$$

01.28.16.0056.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \pi\sqrt{-\frac{1}{z^2}}\ z + 2\coth^{-1}(z)\ /;\ |z| < 1$$

01.28.16.0005.01

$$\coth^{-1}\left(\frac{z^2+1}{2z}\right) = 2\coth^{-1}(z)\ /;\ |z| > 1$$

01.28.16.0057.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \frac{\pi}{2}\left(1 - \frac{z+i}{z-i}\sqrt{\left(\frac{z-i}{z+i}\right)^2}\right)\sqrt{-\frac{1}{z^2}}\ z + 2\coth^{-1}(z)\ /;\ |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0058.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\coth^{-1}\left(\frac{1}{z}\right)\ /;\ |z| < 1$$

01.28.16.0059.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\coth^{-1}\left(\frac{1}{z}\right) - \pi i\ /;\ |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.16.0060.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\coth^{-1}\left(\frac{1}{z}\right) + \pi i\ /;\ |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.16.0061.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi\sqrt{-z^2}}{z}\ /;\ |z| > 1$$

01.28.16.0062.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \frac{\pi\sqrt{-z^2}}{2z}\left(\frac{z+i}{z-i}\sqrt{\left(\frac{z-i}{z+i}\right)^2} + 1\right) + 2\coth^{-1}\left(\frac{1}{z}\right)\ /;\ |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right)$ and $\coth^{-1}\left(\sqrt{z}\right)$

01.28.16.0063.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\coth^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2}\ /;\ 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0064.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\coth^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.16.0065.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\coth^{-1}\left(\sqrt{z}\right) - \frac{\pi\sqrt{1-z}}{2\sqrt{z-1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right)$ and $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.16.0066.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0067.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.16.0068.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right)$ and $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.16.0069.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0070.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.16.0071.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = -2\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.16.0072.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)$ and $\coth^{-1}\left(\sqrt{z}\right)$

01.28.16.0073.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\coth^{-1}\left(\sqrt{z}\right) + \pi i \;/;\; |z| < 1 \land \operatorname{Im}(z) \geq 0$$

01.28.16.0074.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\coth^{-1}\left(\sqrt{z}\right) - \pi i \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.16.0075.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\coth^{-1}\left(\sqrt{z}\right) + \pi \sqrt{-\frac{1}{z}}\sqrt{z} \;/;\; |z| < 1$$

01.28.16.0076.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\coth^{-1}\left(\sqrt{z}\right) \;/;\; |z| > 1$$

01.28.16.0077.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}\left(\frac{1-z}{1+z}\sqrt{\left(\frac{z+1}{z-1}\right)^2} + 1\right) + 2\coth^{-1}\left(\sqrt{z}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)$ and $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.16.0078.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| < 1$$

01.28.16.0079.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.16.0080.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi i \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.16.0081.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\sqrt{-z^2}}{z} \;/;\; |z| > 1$$

01.28.16.0082.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = \frac{\pi\sqrt{-z}}{2\sqrt{z}}\left(\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2} + 1\right) + 2\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)$ and $\coth^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.16.0083.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z| < 1 \bigwedge |\arg(z)| < \pi$$

01.28.16.0084.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == -2\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0085.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\sqrt{z}\sqrt{\frac{1}{z}}\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z| < 1$$

01.28.16.0086.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; |z| > 1 \land \operatorname{Im}(z) > 0$$

01.28.16.0087.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi i /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.16.0088.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == -2\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.16.0089.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\sqrt{z}\sqrt{\frac{1}{z}}\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\sqrt{-z^2}}{z} /; |z| > 1$$

01.28.16.0090.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == \frac{\pi\sqrt{-z}}{2\sqrt{z}}\left(\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2} + 1\right) + 2\sqrt{z}\sqrt{\frac{1}{z}}\coth^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z^2-1} + c\,z\right)$

Involving $\coth^{-1}\left(\sqrt{z^2-1} + z\right)$ and $\coth^{-1}(z)$

01.28.16.0091.01

$$\coth^{-1}\left(\sqrt{z^2-1} + z\right) == \frac{1}{2}\coth^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.16.0092.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = \frac{\pi i}{2}+\frac{1}{2}\coth^{-1}(z) /; \frac{\pi}{2}<\arg(z)<\pi \bigvee (z \in \mathbb{R} \land z<-1)$$

01.28.16.0093.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{\pi i}{2}+\frac{1}{2}\coth^{-1}(z) /; -\pi<\arg(z)\leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1<z<0)$$

01.28.16.0094.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{\pi\sqrt{-z-1}\left(z-\sqrt{z^2}\right)}{4\sqrt{z+1}\,z}+\frac{1}{2}\coth^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}+z\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0095.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right)-\frac{\pi i}{4} /; 0<\arg(z)\leq\frac{\pi}{2} \bigvee -\pi<\arg(z)\leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1<z<1)$$

01.28.16.0096.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right)+\frac{\pi i}{4} /; \frac{\pi}{2}<\arg(z)<\pi \bigvee -\frac{\pi}{2}<\arg(z)<0 \bigvee (z \in \mathbb{R} \land z<-1) \bigvee (z \in \mathbb{R} \land z>1)$$

01.28.16.0097.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right)-\frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}-z\right)$ and $\coth^{-1}(z)$

01.28.16.0098.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{\pi i}{2}-\frac{1}{2}\coth^{-1}(z) /; 0<\arg(z)\leq\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0<z<1)$$

01.28.16.0099.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{1}{2}\coth^{-1}(z) /; \frac{\pi}{2}<\arg(z)\leq\pi \bigvee -\pi<\arg(z)\leq -\frac{\pi}{2}$$

01.28.16.0100.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = \frac{\pi i}{2}-\frac{1}{2}\coth^{-1}(z) /; -\frac{\pi}{2}<\arg(z)<0 \bigvee (z \in \mathbb{R} \land z>1)$$

01.28.16.0101.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{\pi\sqrt{z-1}}{4\sqrt{1-z}\,z}\left(z+\sqrt{z^2}\right)-\frac{1}{2}\coth^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}-z\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0102.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \frac{\pi}{2} \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.16.0103.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.16.0104.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+c\,z}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)$ and $\coth^{-1}(z)$

01.28.16.0105.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{\pi i}{2} + \frac{1}{2}\coth^{-1}(z) \;/;\; 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0106.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{1}{2}\coth^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) \le \pi \bigvee -\pi < \arg(z) \le -\frac{\pi}{2}$$

01.28.16.0107.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = -\frac{\pi i}{2} + \frac{1}{2}\coth^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.16.0108.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{\pi\sqrt{z-1}}{4\sqrt{1-z}\,z}\left(z+\sqrt{z^2}\right) + \frac{1}{2}\coth^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0109.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \frac{\pi}{2} \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.16.0110.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.16.0111.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right)$ and $\coth^{-1}(z)$

01.28.16.0112.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{1}{2}\coth^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.16.0113.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{\pi i}{2} - \frac{1}{2}\coth^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.16.0114.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{\pi i}{2} - \frac{1}{2}\coth^{-1}(z) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0115.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{\pi\sqrt{-z-1}\left(z-\sqrt{z^2}\right)}{4\sqrt{z+1}\,z} - \frac{1}{2}\coth^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0116.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.16.0117.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.16.0118.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right)$ and $\coth^{-1}(z)$

01.28.16.0119.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{1}{2}\coth^{-1}(z) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0120.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{1}{2}\coth^{-1}(z) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0121.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{1}{2}\coth^{-1}(z) + \frac{\pi z \sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0122.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right)$ and $\coth^{-1}(z)$

01.28.16.0123.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{1}{2}\coth^{-1}(z) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0124.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{1}{2}\coth^{-1}(z) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0125.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{1}{2}\coth^{-1}(z) + \frac{\pi z \sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0126.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = \frac{\pi i}{2} - \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0127.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{\pi i}{2} - \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0128.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) + \frac{\pi z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right)$ and $\coth^{-1}(z)$

01.28.16.0129.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = \frac{1}{2}\coth^{-1}(z) - \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0130.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = \frac{1}{2}\coth^{-1}(z) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0131.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = \frac{1}{2}\coth^{-1}(z) - \frac{\pi z\sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0132.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = -\frac{\pi i}{2} + \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0133.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = \frac{\pi i}{2} + \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0134.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = \frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right) - \frac{\pi z \sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right)$ and $\coth^{-1}(z)$

01.28.16.0135.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{1}{2}\coth^{-1}(z) - \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.16.0136.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{1}{2}\coth^{-1}(z) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.16.0137.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{1}{2}\coth^{-1}(z) - \frac{\pi z \sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right)$ and $\coth^{-1}\left(\frac{1}{z}\right)$

01.28.16.0138.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{1}{2}\coth^{-1}\left(\frac{1}{z}\right)$$

Products, sums, and powers of the direct function

Sums of the direct function

01.28.16.0007.01

$$\coth^{-1}(x) + \coth^{-1}(y) = \coth^{-1}\left(\frac{x y + 1}{x + y}\right) - \frac{\pi i}{2} \operatorname{sgn}\left(\frac{x+y}{x y}\right)\left(\operatorname{sgn}\left(1 + \frac{1}{x y}\right) + 1\right) /; |x| < 1 \bigwedge |y| < 1$$

01.28.16.0008.01

$$\coth^{-1}(x) + \coth^{-1}(y) = \coth^{-1}\left(\frac{x y + 1}{x + y}\right) - \frac{\pi i}{2} \operatorname{sgn}\left(\frac{x+y}{x y}\right)\left(1 - \operatorname{sgn}\left(1 + \frac{1}{x y}\right)\right) /; |x| > 1 \bigvee |y| > 1$$

01.28.16.0147.01

$$\coth^{-1}(x)+\coth^{-1}(y)=$$
$$\tanh^{-1}\left(\frac{x+y}{x\,y+1}\right)-i\,\pi\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)-\arg\left(1+\frac{1}{y}\right)+\arg\left(1+\frac{1}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor+i\,\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right)-\arg\left(1-\frac{1}{y}\right)+\arg\left(1+\frac{1}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor$$

01.28.16.0148.01

$$\coth^{-1}(x)+\coth^{-1}(y)=$$
$$\coth^{-1}\left(\frac{x\,y+1}{x+y}\right)-\pi\,i\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)-\arg\left(1+\frac{1}{y}\right)+\arg\left(1+\frac{1}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor+i\,\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right)-\arg\left(1-\frac{1}{y}\right)+\arg\left(1+\frac{1}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor$$

Differences of the direct function

01.28.16.0009.01

$$\coth^{-1}(x)-\coth^{-1}(y)=\coth^{-1}\left(\frac{1-x\,y}{x-y}\right)-\frac{\pi\,i}{2}\,\operatorname{sgn}\left(\frac{y-x}{x\,y}\right)\left(\operatorname{sgn}\left(1-\frac{1}{x\,y}\right)+1\right)\;/;\;|x|<1\bigwedge|y|<1$$

01.28.16.0010.01

$$\coth^{-1}(x)-\coth^{-1}(y)=\coth^{-1}\left(\frac{1-x\,y}{x-y}\right)-\frac{\pi\,i}{2}\,\operatorname{sgn}\left(\frac{y-x}{x\,y}\right)\left(1-\operatorname{sgn}\left(1-\frac{1}{x\,y}\right)\right)\;/;\;|x|>1\bigvee|y|>1$$

01.28.16.0149.01

$$\coth^{-1}(x)-\coth^{-1}(y)=$$
$$-\tanh^{-1}\left(\frac{x-y}{x\,y-1}\right)+i\,\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right)-\arg\left(1+\frac{1}{y}\right)+\arg\left(1-\frac{1}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor-i\,\pi\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{y}\right)+\arg\left(1-\frac{1}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor$$

01.28.16.0150.01

$$\coth^{-1}(x)-\coth^{-1}(y)=$$
$$\coth^{-1}\left(\frac{1-x\,y}{x-y}\right)+i\,\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right)-\arg\left(1+\frac{1}{y}\right)+\arg\left(1-\frac{1}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor-\pi\,i\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{y}\right)+\arg\left(1-\frac{1}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor$$

Linear combinations of the direct function

01.28.16.0151.01

$$a\coth^{-1}(x)+b\coth^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(b\log\left(1-\frac{1}{y}\right)\right)+\pi}{2\,\pi}\right\rfloor\right)-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(1+\frac{1}{y}\right)^{b/2}\right)-\arg\left(\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\operatorname{Im}\left(b\log\left(1+\frac{1}{y}\right)\right)}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(\log\left(\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)\right)}{2\,\pi}\right\rfloor\right)+$$
$$\log\left(\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\left(1+\frac{1}{y}\right)^{b/2}\right)$$

01.28.16.0152.01

$$a \coth^{-1}(x) + b \coth^{-1}(y) = a\, i\, \pi \left\lfloor \frac{\arg\left(1+\frac{1}{x}\right) - \arg\left(1-\frac{1}{x}\right) + \pi}{2\pi} \right\rfloor -$$

$$2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}}\right) - \arg\left(\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Im}\left(a \log\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Im}\left(b \log\left(1-\frac{1}{y}\right)\right) + \pi}{2\pi} \right\rfloor \right) -$$

$$2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(1+\frac{1}{y}\right)^{b/2}\right) - \arg\left(\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}} \left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \frac{1}{2} \operatorname{Im}\left(b \log\left(1+\frac{1}{y}\right)\right)}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \operatorname{Im}\left(\log\left(\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}} \left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)\right)}{2\pi} \right\rfloor \right) +$$

$$i\, \pi \left(1 - (-1)^{\left\lfloor \frac{\arg\left(\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}} \left(1-\frac{1}{y}\right)^{-\frac{b}{2}} \left(1+\frac{1}{y}\right)^{b/2} + 1\right)}{2\pi} + \frac{1}{2} \right\rfloor}\right) + 2 \coth^{-1}\left(\frac{\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}} \left(1-\frac{1}{y}\right)^{-\frac{b}{2}} \left(1+\frac{1}{y}\right)^{b/2} + 1}{\left(\frac{1-\frac{1}{x}}{1+\frac{1}{x}}\right)^{-\frac{a}{2}} \left(1-\frac{1}{y}\right)^{-\frac{b}{2}} \left(1+\frac{1}{y}\right)^{b/2} - 1} \right)$$

Related transformations

Sums involving the direct function

Involving $\log(z)$

01.28.16.0153.01

$$\coth^{-1}(x) + \log(y) =$$

$$i\, \pi \left\lfloor \frac{\arg\left(1+\frac{1}{x}\right) - \arg\left(1-\frac{1}{x}\right) + \pi}{2\pi} \right\rfloor - 2\, i\, \pi \left(\left\lfloor \frac{\frac{1}{2} \arg\left(\frac{x-1}{x+1}\right) - \arg(y) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \operatorname{Im}(\log(y))}{2\pi} \right\rfloor \right) + \log\left(\frac{y}{\sqrt{\frac{x-1}{x+1}}} \right)$$

01.28.16.0154.01

$$\coth^{-1}(x)+\log(y)=$$
$$i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg(y)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}(\log(y))}{2\,\pi}\right\rfloor\right)+$$
$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{y}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{y}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{y}{\sqrt{\frac{x-1}{x+1}}}-1}\right)$$

Involving $\sin^{-1}(z)$

01.28.16.0155.01

$$\coth^{-1}(x)+\sin^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(i\,y+\sqrt{1-y^2}\right)^{-i}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\operatorname{Re}\left(\log\left(i\,y+\sqrt{1-y^2}\right)\right)+\pi}{2\,\pi}\right\rfloor\right)+$$
$$\log\left(\frac{\left(i\,y+\sqrt{1-y^2}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}\right)$$

01.28.16.0156.01

$$\coth^{-1}(x)+\sin^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-$$

$$2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(i\,y+\sqrt{1-y^2}\right)^{-i}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\operatorname{Re}\left(\log\left(i\,y+\sqrt{1-y^2}\right)\right)+\pi}{2\,\pi}\right\rfloor\right)+$$

$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(i\,y+\sqrt{1-y^2}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(i\,y+\sqrt{1-y^2}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(i\,y+\sqrt{1-y^2}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)$$

01.28.16.0157.01

$$\coth^{-1}(x)+i\sin^{-1}(y)=-\frac{i\sqrt{1-\frac{1}{x^2}}\sqrt{\frac{\left(x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\;x}{x\,y-i\sqrt{1-y^2}}\sin^{-1}\left(\frac{\frac{i\,y}{x}+\sqrt{1-y^2}}{\sqrt{1-\frac{1}{x^2}}}\right)+$$

$$\frac{i\,\pi\sqrt{\frac{\left(x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\sqrt{1-\frac{1}{x^2}}\;x}{2\left(x\,y-i\sqrt{1-y^2}\right)}+i\,\pi\left(\frac{\sqrt{\frac{\left(x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\sqrt{1-\frac{1}{x^2}}\;x}{x\,y-i\sqrt{1-y^2}}+1\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)}{2\,\pi}\right\rfloor-$$

$$i\,\pi\left(\frac{\sqrt{1-\frac{1}{x^2}}\;x\sqrt{\frac{\left(x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}}{x\,y-i\sqrt{1-y^2}}-1\right)\left\lfloor-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0158.01

$$\coth^{-1}(x)+i\sin^{-1}(y)=\coth^{-1}\left(\frac{(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(\frac{y}{x}-i\sqrt{1-y^2}\right)}{\sqrt{1-\frac{1}{x^2}}\sqrt{1-\frac{\left(-\frac{i\,y}{x}-\sqrt{1-y^2}\right)^2}{1-\frac{1}{x^2}}}}\right)+$$

$$\frac{1}{2}i\pi\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)}{2\pi}\right\rfloor+(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(-\frac{i\,y}{x}-\sqrt{1-y^2}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}+\right.$$

$$\left.(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)}{2\pi}\right\rfloor\right)$$

Involving $\cos^{-1}(z)$

01.28.16.0159.01

$$\coth^{-1}(x)+\cos^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(i\,y+\sqrt{1-y^2}\right)^i\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Re}\left(\log\left(i\,y+\sqrt{1-y^2}\right)\right)}{2\,\pi}\right\rfloor\right)+\log\left(\frac{\left(i\,y+\sqrt{1-y^2}\right)^i}{\sqrt{\frac{x-1}{x+1}}}\right)+\frac{\pi}{2}$$

01.28.16.0160.01

$$\coth^{-1}(x)+\cos^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(i\,y+\sqrt{1-y^2}\right)^i\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Re}\left(\log\left(i\,y+\sqrt{1-y^2}\right)\right)}{2\,\pi}\right\rfloor\right)+i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(i\,y+\sqrt{1-y^2}\right)^i}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(i\,y+\sqrt{1-y^2}\right)^i}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(i\,y+\sqrt{1-y^2}\right)^i}{\sqrt{\frac{x-1}{x+1}}}-1}\right)+\frac{\pi}{2}$$

01.28.16.0161.01

$$\coth^{-1}(x)+i\cos^{-1}(y)=\frac{\pi i}{2}-\frac{i\sqrt{1-\frac{1}{x^2}}\sqrt{\frac{\left(-x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\;x}{-x\,y-i\sqrt{1-y^2}}\sin^{-1}\left(\frac{\sqrt{1-y^2}-\frac{i\,y}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+$$
$$\frac{i\,\pi\sqrt{\frac{\left(-x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\sqrt{1-\frac{1}{x^2}}\;x}{2\left(-x\,y-i\sqrt{1-y^2}\right)}+i\,\pi\left(\frac{\sqrt{\frac{\left(-x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\sqrt{1-\frac{1}{x^2}}\;x}{-x\,y-i\sqrt{1-y^2}}+1\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-y^2}-i\,y\right)}{2\,\pi}\right\rfloor-$$
$$i\,\pi\left(\frac{\sqrt{1-\frac{1}{x^2}}\;x\sqrt{\frac{\left(-x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}}{-x\,y-i\sqrt{1-y^2}}-1\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-y^2}-i\,y\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0162.01

$$\coth^{-1}(x)+i\cos^{-1}(y)=\coth^{-1}\left(\frac{(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{-y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(-\frac{y}{x}-i\sqrt{1-y^2}\right)}{\sqrt{1-\frac{1}{x^2}}\sqrt{1-\frac{\left(\frac{i\,y}{x}-\sqrt{1-y^2}\right)^2}{1-\frac{1}{x^2}}}}\right)+$$
$$\frac{1}{2}\,i\,\pi\left(1+2\left(1+(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{-y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-y^2}-i\,y\right)}{2\,\pi}\right\rfloor+\right.$$

$$(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{-y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}+(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(\frac{i y}{x}-\sqrt{1-y^2}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{-y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-$$

$$2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{-y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-y^2}-i y\right)}{2\pi}\right\rfloor\Bigg)$$

Involving $\tan^{-1}(z)$

01.28.16.0163.01

$$\coth^{-1}(x)+\tan^{-1}(y)=i\pi\left\lfloor \frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$

$$2 i\pi\left(\left\lfloor \frac{-\arg\left((i y+1)^{-\frac{i}{2}}\right)-\arg\left(\frac{(1-i y)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor \frac{\frac{1}{2}\operatorname{Re}(\log(i y+1))+\pi}{2\pi}\right\rfloor+\left\lfloor \frac{\pi-\operatorname{Im}\left(\log\left(\frac{(1-i y)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)\right)}{2\pi}\right\rfloor\right)-$$

$$2 i\pi\left(\left\lfloor \frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left((1-i y)^{i/2}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor \frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor \frac{\pi-\frac{1}{2}\operatorname{Re}(\log(1-i y))}{2\pi}\right\rfloor\right)+\log\left(\frac{(1-i y)^{i/2}(i y+1)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)$$

01.28.16.0164.01

$$\coth^{-1}(x)+\tan^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left((i\,y+1)^{-\frac{i}{2}}\right)-\arg\left(\frac{(1-i\,y)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Re}(\log(i\,y+1))+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(\log\left(\frac{(1-i\,y)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)\right)}{2\,\pi}\right\rfloor\right)-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left((1-i\,y)^{i/2}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\operatorname{Re}(\log(1-i\,y))}{2\,\pi}\right\rfloor\right)+i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{(i\,y+1)^{-\frac{i}{2}}(1-i\,y)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{(i\,y+1)^{-\frac{i}{2}}(1-i\,y)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{(1-i\,y)^{i/2}(i\,y+1)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)$$

01.28.16.0165.01

$$\coth^{-1}(x)+i\tan^{-1}(y)=-i\tan^{-1}\left(\frac{i-x\,y}{x+i\,y}\right)-i\,\pi\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)+\arg\left(\frac{i\,y}{x}+1\right)-\arg(i\,y+1)+\pi}{2\,\pi}\right\rfloor+i\,\pi\left\lfloor\frac{\arg\left(\frac{i\,y}{x}+1\right)-\arg\left(1-\frac{1}{x}\right)-\arg(1-i\,y)+\pi}{2\,\pi}\right\rfloor$$

01.28.16.0166.01

$$\coth^{-1}(x)+i\tan^{-1}(y)=\coth^{-1}\left(\frac{x+i\,y}{i\,x\,y+1}\right)-\pi\,i\left\lfloor\frac{\arg\left(\frac{i\,y}{x}+1\right)-\arg(i\,y+1)-\arg\left(1+\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor+i\,\pi\left\lfloor\frac{\arg\left(\frac{i\,y}{x}+1\right)-\arg\left(1-\frac{1}{x}\right)-\arg(1-i\,y)+\pi}{2\,\pi}\right\rfloor$$

Involving $\cot^{-1}(z)$

01.28.16.0167.01

$$\coth^{-1}(x)+\cot^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\frac{\left(1-\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)-\arg\left(\left(1+\frac{i}{y}\right)^{-\frac{i}{2}}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Re}\left(\log\left(1+\frac{i}{y}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\mathrm{Im}\left(\log\left(\frac{\left(1-\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)\right)}{2\,\pi}\right\rfloor\right)-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(1-\frac{i}{y}\right)^{i/2}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\,\mathrm{Re}\left(\log\left(1-\frac{i}{y}\right)\right)}{2\,\pi}\right\rfloor\right)+\log\left(\frac{\left(1-\frac{i}{y}\right)^{i/2}\left(1+\frac{i}{y}\right)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)$$

01.28.16.0168.01

$$\coth^{-1}(x)+\cot^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\frac{\left(1-\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)-\arg\left(\left(1+\frac{i}{y}\right)^{-\frac{i}{2}}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Re}\left(\log\left(1+\frac{i}{y}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\mathrm{Im}\left(\log\left(\frac{\left(1-\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)\right)}{2\,\pi}\right\rfloor\right)-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(1-\frac{i}{y}\right)^{i/2}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\,\mathrm{Re}\left(\log\left(1-\frac{i}{y}\right)\right)}{2\,\pi}\right\rfloor\right)+i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(1+\frac{i}{y}\right)^{-\frac{i}{2}}\left(1-\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(1+\frac{i}{y}\right)^{-\frac{i}{2}}\left(1-\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(1-\frac{i}{y}\right)^{i/2}\left(1+\frac{i}{y}\right)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)$$

01.28.16.0169.01

$$\coth^{-1}(x) + i\cot^{-1}(y) = i\tan^{-1}\left(\frac{x - i y}{i + x y}\right) - i\pi\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right) - \arg\left(1+\frac{i}{y}\right) + \arg\left(1+\frac{i}{x y}\right) + \pi}{2\pi}\right\rfloor + i\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right) - \arg\left(1-\frac{i}{y}\right) + \arg\left(1+\frac{i}{x y}\right) + \pi}{2\pi}\right\rfloor$$

01.28.16.0170.01

$$\coth^{-1}(x) + i\cot^{-1}(y) = \coth^{-1}\left(\frac{1 - i x y}{x - i y}\right) - \pi i\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right) - \arg\left(1+\frac{i}{y}\right) + \arg\left(1+\frac{i}{x y}\right) + \pi}{2\pi}\right\rfloor + i\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right) - \arg\left(1-\frac{i}{y}\right) + \arg\left(1+\frac{i}{x y}\right) + \pi}{2\pi}\right\rfloor$$

Involving $\csc^{-1}(z)$

01.28.16.0171.01

$$\coth^{-1}(x) + \csc^{-1}(y) = i\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right) - \arg\left(1-\frac{1}{x}\right) + \pi}{2\pi}\right\rfloor - 2 i\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right) - \arg\left(\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-i}\right) + \pi}{2\pi}\right\rfloor + \left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi}\right\rfloor + \left\lfloor\frac{\operatorname{Re}\left(\log\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)\right) + \pi}{2\pi}\right\rfloor\right) + \log\left(\frac{\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}\right)$$

01.28.16.0172.01

$$\coth^{-1}(x)+\csc^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-$$

$$2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\mathrm{Re}\left(\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)+\pi}{2\,\pi}\right\rfloor\right)+$$

$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)$$

01.28.16.0173.01

$$\coth^{-1}(x) + i\csc^{-1}(y) =$$

$$-\frac{i\sqrt{1-\frac{1}{x^2}}\,x\sqrt{\frac{x^2-2i\sqrt{1-\frac{1}{y^2}}\,y\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{x-i\sqrt{1-\frac{1}{y^2}}\;y}\sin^{-1}\left(\frac{\sqrt{1-\frac{1}{y^2}}+\frac{i}{x\,y}}{\sqrt{1-\frac{1}{x^2}}}\right)+\frac{i\,\pi\,x\sqrt{1-\frac{1}{x^2}}\sqrt{\frac{x^2-2i\sqrt{1-\frac{1}{y^2}}\,y\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{2\left(x-i\sqrt{1-\frac{1}{y^2}}\;y\right)}+$$

$$i\,\pi\left(\frac{x\sqrt{1-\frac{1}{x^2}}\sqrt{\frac{x^2-2i\sqrt{1-\frac{1}{y^2}}\,y\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{x-i\sqrt{1-\frac{1}{y^2}}\;y}+1\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\,\pi}\right\rfloor-$$

$$\pi\,i\left(\frac{\sqrt{1-\frac{1}{x^2}}\;x\,y\sqrt{\frac{x^2-2i\sqrt{1-\frac{1}{y^2}}\,y\,x-y^2+1}{(x^2-1)\,y^2}}}{x-i\sqrt{1-\frac{1}{y^2}}\;y}-1\right)\left\lfloor-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0174.01

$$\coth^{-1}(x)+i\csc^{-1}(y)=\coth^{-1}\left(\frac{(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(-i\sqrt{1-\frac{1}{y^2}}+\frac{1}{x\,y}\right)}{\sqrt{1-\frac{1}{x^2}}\;\sqrt{1-\frac{\left(-\sqrt{1-\frac{1}{y^2}}-\frac{i}{x\,y}\right)^2}{1-\frac{1}{x^2}}}}\right)+\frac{1}{2}\,i\,\pi$$

$$\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\ldots\sqrt{1-\frac{1}{x^2}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor+(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(-\sqrt{1-\frac{1}{y^2}}-\frac{i}{x\,y}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\ldots\sqrt{1-\frac{1}{x^2}}\right)}{\pi}\right\rfloor}+\right.$$

$$\left.(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor\right)$$

Involving $\sec^{-1}(z)$

01.28.16.0175.01

$$\coth^{-1}(x)+\sec^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Re}\left(\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)}{2\,\pi}\right\rfloor\right)+\log\left(\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}}{\sqrt{\frac{x-1}{x+1}}}\right)+\frac{\pi}{2}$$

01.28.16.0176.01

$$\coth^{-1}(x)+\sec^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Re}\left(\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)}{2\,\pi}\right\rfloor\right)+i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)+\frac{\pi}{2}$$

01.28.16.0177.01

$$\coth^{-1}(x)+i\sec^{-1}(y)=$$

$$\frac{\pi i}{2}+\frac{i\,x\sqrt{1-\frac{1}{x^2}}\sqrt{\frac{x^2+2\,i\,y\sqrt{1-\frac{1}{y^2}}\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{x+i\,y\sqrt{1-\frac{1}{y^2}}}\sin^{-1}\left(\frac{\sqrt{1-\frac{1}{y^2}}-\frac{i}{x\,y}}{\sqrt{1-\frac{1}{x^2}}}\right)-\frac{i\,\pi\sqrt{1-\frac{1}{x^2}}\;x\sqrt{\frac{x^2+2\,i\,y\sqrt{1-\frac{1}{y^2}}\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{2\left(x+i\,y\sqrt{1-\frac{1}{y^2}}\right)}+$$

$$i\,\pi\left(1-\frac{\sqrt{1-\frac{1}{x^2}}\;x\,y\sqrt{\frac{x^2+2\,i\,y\sqrt{1-\frac{1}{y^2}}\,x-y^2+1}{(x^2-1)\,y^2}}}{x+i\,y\sqrt{1-\frac{1}{y^2}}}\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}-\frac{i}{y}\right)}{2\,\pi}\right\rfloor-$$

$$i\,\pi\left(-\frac{\sqrt{1-\frac{1}{x^2}}\;x\sqrt{\frac{x^2+2\,i\,y\sqrt{1-\frac{1}{y^2}}\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{x+i\,y\sqrt{1-\frac{1}{y^2}}}-1\right)\left\lfloor-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}-\frac{i}{y}\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0178.01

$$\coth^{-1}(x)+i\sec^{-1}(y)=\coth^{-1}\left(\frac{(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}-\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(-i\sqrt{1-\frac{1}{y^2}}-\frac{1}{x\,y}\right)}{\sqrt{1-\frac{1}{x^2}}\sqrt{1-\frac{\left(\frac{i}{x\,y}-\sqrt{1-\frac{1}{y^2}}\right)^2}{1-\frac{1}{x^2}}}}\right)+$$

$$\frac{1}{2}\, i\, \pi \left(1 + 2\left(1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\ldots \sqrt{1-\frac{1}{x^2}} \ldots\right)}{\pi} \right\rfloor}\right) \left\lfloor \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} - \frac{i}{y}\right)}{2\pi} \right\rfloor \right) +$$

$$(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi} + \frac{\arg\left(\frac{i}{x\,y} - \sqrt{1-\frac{1}{y^2}}\right)}{\pi} + \frac{1}{2} \right\rfloor + \left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{-\frac{i\sqrt{1-\frac{1}{y^2}}}{x} - \frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor} + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{-\frac{i\sqrt{1-\frac{1}{y^2}}}{x} - \frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor} -$$

$$2\left(-1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{-\frac{i\sqrt{1-\frac{1}{y^2}}}{x} - \frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor}\right) \left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} - \frac{i}{y}\right)}{2\pi} \right\rfloor \Bigg)$$

Involving $\sinh^{-1}(z)$

01.28.16.0179.01

$$\tanh^{-1}(x)+\sinh^{-1}(y)=\frac{\sqrt{1-x^2}\,\sqrt{\frac{(y^2+1)x^2+2y\sqrt{y^2+1}\,x+y^2}{x^2-1}}}{\sqrt{y^2+1}\,x+y}\sin^{-1}\left(\frac{x\,y+\sqrt{y^2+1}}{\sqrt{1-x^2}}\right)-$$
$$i\,\pi\left(1-\frac{i\sqrt{1-x^2}\,\sqrt{\frac{(y^2+1)x^2+2y\sqrt{y^2+1}\,x+y^2}{x^2-1}}}{\sqrt{y^2+1}\,x+y}\right)\left\lfloor\frac{\arg\left(\frac{i-i\,x}{\sqrt{1-x^2}}\right)+\arg\left(\sqrt{y^2+1}-y\right)}{2\pi}\right\rfloor-$$
$$i\,\pi\left(1+\frac{i\sqrt{1-x^2}\,\sqrt{\frac{(y^2+1)x^2+2y\sqrt{y^2+1}\,x+y^2}{x^2-1}}}{\sqrt{y^2+1}\,x+y}\right)\left\lfloor-\frac{\arg\left(\frac{i-i\,x}{\sqrt{1-x^2}}\right)+\arg\left(\sqrt{y^2+1}-y\right)-\pi}{2\pi}\right\rfloor-$$
$$\frac{\pi\sqrt{1-x^2}\,\sqrt{\frac{(y^2+1)x^2+2y\sqrt{y^2+1}\,x+y^2}{x^2-1}}}{2\left(\sqrt{y^2+1}\,x+y\right)}$$

01.28.16.0180.01

$$\coth^{-1}(x)+\sinh^{-1}(y)=\coth^{-1}\left(\frac{i\,(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i\,y+\frac{i\sqrt{y^2+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(\frac{y}{x}+\sqrt{y^2+1}\right)}{\sqrt{1-\frac{1}{x^2}}\,\sqrt{1-\frac{\left(\frac{y}{x}+\sqrt{y^2+1}\right)^2}{1-\frac{1}{x^2}}}}\right)-$$

$$\frac{1}{2}\pi\,i\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i\,y+\frac{i\sqrt{y^2+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{y^2+1}-y\right)}{2\pi}\right\rfloor+(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(-\frac{y}{x}-\sqrt{y^2+1}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i\,y+\frac{i\sqrt{y^2+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}+\right.$$

$$\left.(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i\,y+\frac{i\sqrt{y^2+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i\,y+\frac{i\sqrt{y^2+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{y^2+1}-y\right)}{2\pi}\right\rfloor\right)$$

Involving $\cosh^{-1}(z)$

01.28.16.0181.01

$$\coth^{-1}(x)+\cosh^{-1}(y)=$$

$$\coth^{-1}\left(\frac{(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y+\frac{\sqrt{y-1}\sqrt{y+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(\frac{y}{x}+\sqrt{y-1}\sqrt{y+1}\right)}{\sqrt{1-\frac{1}{x^2}}\sqrt{\frac{\left(\frac{y}{x}+\sqrt{y-1}\sqrt{y+1}\right)^2}{1-\frac{1}{x^2}}+1}}\right)-\frac{1}{2}\pi i(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(\frac{iy}{x}+i\sqrt{y-1}\sqrt{y+1}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y+\frac{\sqrt{y-1}\sqrt{y+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-$$

$$\frac{1}{4}\left(1+(-1)^{-\left\lfloor -\frac{\arg(1-y)}{2\pi}\right\rfloor}\right)\pi i\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y+\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\right)\left\lfloor \frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(iy+\sqrt{1-y^2}\right)}{2\pi}\right\rfloor+$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{y + \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor} - 2\left(-1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{y + \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor}\right) \left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{i - \frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right) + \arg\left(i\, y + \sqrt{1-y^2}\right)}{2\pi} \right\rfloor - 1 \Bigg) +$$

$$\frac{1}{4}\left(1 - (-1)^{-\left\lfloor -\frac{\arg(1-y)}{2\pi} \right\rfloor}\right) \pi\, i \left(2\left(1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{y - \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor}\right) \left\lfloor \frac{\arg\left(\frac{i + \frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right) + \arg\left(i\, y + \sqrt{1-y^2}\right)}{2\pi} \right\rfloor + \right.$$

$$\left. (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{y - \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor} - 2\left(-1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{y - \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor}\right) \left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{i + \frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right) + \arg\left(i\, y + \sqrt{1-y^2}\right)}{2\pi} \right\rfloor - 1 \right)$$

Involving $\tanh^{-1}(z)$

01.28.16.0011.01

$$\coth^{-1}(x) + \tanh^{-1}(y) = \tanh^{-1}\left(\frac{x\, y + 1}{x + y}\right) - \frac{\pi\, i}{2}\left(1 - \operatorname{sgn}(x + y)\right) \operatorname{sgn}(x\, y + 1) \,/;\, y > 1 \lor |x| < 1 \land y > 0 \lor x > 1 \land -1 < y < 0$$

01.28.16.0012.01

$$\coth^{-1}(x)+\tanh^{-1}(y)=\tanh^{-1}\left(\frac{x\,y+1}{x+y}\right)+\frac{\pi\,i}{2}\,(\operatorname{sgn}(x+y)+1)\operatorname{sgn}(x\,y+1)\;/;\;(x<-1\lor|y|<1\land x<0)\lor y<-1\land 0<x<1$$

01.28.16.0013.01

$$\coth^{-1}(x)+\tanh^{-1}(y)=\tanh^{-1}\left(\frac{x\,y+1}{x+y}\right)-\pi\,i\operatorname{sgn}\left(\frac{x\,y+1}{x+y}\right)\;/;\;y>1\land 0<x<1\lor y<-1\land -1<x<0$$

01.28.16.0182.01

$$\coth^{-1}(x)+\tanh^{-1}(y)=$$
$$\tanh^{-1}\left(\frac{x\,y+1}{x+y}\right)+i\,\pi\left\lfloor\frac{\arg\left(\frac{y}{x}+1\right)-\arg\left(1-\frac{1}{x}\right)-\arg(1-y)+\pi}{2\,\pi}\right\rfloor-i\,\pi\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)+\arg\left(\frac{y}{x}+1\right)-\arg(y+1)+\pi}{2\,\pi}\right\rfloor$$

01.28.16.0183.01

$$\coth^{-1}(x)+\tanh^{-1}(y)=$$
$$\coth^{-1}\left(\frac{x+y}{x\,y+1}\right)-\pi\,i\left\lfloor\frac{\arg\left(\frac{y}{x}+1\right)-\arg(y+1)-\arg\left(1+\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor+i\,\pi\left\lfloor\frac{\arg\left(\frac{y}{x}+1\right)-\arg\left(1-\frac{1}{x}\right)-\arg(1-y)+\pi}{2\,\pi}\right\rfloor$$

Involving $\operatorname{csch}^{-1}(z)$

01.28.16.0184.01

$$\coth^{-1}(x)+\operatorname{csch}^{-1}(y)=$$
$$\frac{x\sqrt{1-\frac{1}{x^2}}\sqrt{-\frac{x^2+2\,y\sqrt{1+\frac{1}{y^2}}\,x+y^2+1}{(x^2-1)\,y^2}}\;y}{x+y\sqrt{1+\frac{1}{y^2}}}\sin^{-1}\left(\frac{\sqrt{1+\frac{1}{y^2}}+\frac{1}{x\,y}}{\sqrt{1-\frac{1}{x^2}}}\right)-\frac{\pi\sqrt{1-\frac{1}{x^2}}\;x\sqrt{-\frac{x^2+2\,y\sqrt{1+\frac{1}{y^2}}\,x+y^2+1}{(x^2-1)\,y^2}}\;y}{2\left(x+y\sqrt{1+\frac{1}{y^2}}\right)}-$$
$$i\,\pi\left(1-\frac{i\sqrt{1-\frac{1}{x^2}}\;x\,y\sqrt{-\frac{x^2+2\,y\sqrt{1+\frac{1}{y^2}}\,x+y^2+1}{(x^2-1)\,y^2}}}{x+y\sqrt{1+\frac{1}{y^2}}}\right)\left\lfloor\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1+\frac{1}{y^2}}-\frac{1}{y}\right)}{2\,\pi}\right\rfloor+$$
$$i\,\pi\left(-\frac{i\sqrt{1-\frac{1}{x^2}}\;x\sqrt{-\frac{x^2+2\,y\sqrt{1+\frac{1}{y^2}}\,x+y^2+1}{(x^2-1)\,y^2}}\;y}{x+y\sqrt{1+\frac{1}{y^2}}}-1\right)\left\lfloor-\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1+\frac{1}{y^2}}-\frac{1}{y}\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0185.01

$$\coth^{-1}(x)+\operatorname{csch}^{-1}(y)=\coth^{-1}\left(\frac{i\,(-1)^{\left\lfloor \frac{1}{2}-\frac{\ldots}{\pi}\right\rfloor}\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{x\,y}\right)}{\sqrt{1-\frac{1}{x^2}}\,\sqrt{1-\frac{\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{x\,y}\right)^2}{1-\frac{1}{x^2}}}}\right)-\frac{1}{2}\,\pi\,i$$

$$\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}+\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1+\frac{1}{y^2}}-\frac{1}{y}\right)}{2\,\pi}\right\rfloor+(-1)^{\left\lfloor-\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(-\sqrt{1+\frac{1}{y^2}}-\frac{1}{x\,y}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}+\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}+\right.$$

$$\left.(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}+\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}+\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1+\frac{1}{y^2}}-\frac{1}{y}\right)}{2\,\pi}\right\rfloor\right)$$

Involving $\text{sech}^{-1}(z)$

01.28.16.0186.01

$$\coth^{-1}(x)+\text{sech}^{-1}(y)=\coth^{-1}\left(\frac{(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}}{x}+\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{x\,y}\right)}{\sqrt{1-\frac{1}{x^2}}\,\sqrt{\frac{\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{x\,y}\right)^2}{1-\frac{1}{x^2}}+1}}\right)-$$

$$\frac{1}{2}\,i\,(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(i\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{i}{x\,y}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}}{x}+\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\pi-$$

$$\frac{1}{4}\left(1+(-1)^{-\left\lfloor -\frac{\arg\left(1-\frac{1}{y}\right)}{2\pi}\right\rfloor}\right)\pi\, i\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1-\frac{1}{y^2}}}{x}+\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\right)\left\lfloor\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor+$$

$$(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1-\frac{1}{y^2}}}{x}+\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1-\frac{1}{y^2}}}{x}+\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor-1\Bigg)+$$

$$\frac{1}{4}\left(1-(-1)^{-\left\lfloor -\frac{\arg\left(1-\frac{1}{y}\right)}{2\pi}\right\rfloor}\right)\pi\, i\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\right)\left\lfloor \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor+$$

$$(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor-1$$

Differences involving the direct function

Involving log(z)

01.28.16.0187.01

$$\coth^{-1}(x) - \log(y) = i\pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\pi} \right\rfloor - 2 i \pi \left(\left\lfloor \frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right) - \arg\left(\frac{1}{y}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\operatorname{Im}(\log(y)) + \pi}{2\pi} \right\rfloor \right) + \log\left(\frac{1}{\sqrt{\frac{x-1}{x+1}}\, y} \right)$$

01.28.16.0188.01

$$\coth^{-1}(x) - \log(y) = i\pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\pi} \right\rfloor - 2 i \pi \left(\left\lfloor \frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right) - \arg\left(\frac{1}{y}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\operatorname{Im}(\log(y)) + \pi}{2\pi} \right\rfloor \right) + i\pi \left(1 - (-1)^{\left\lfloor \frac{\arg\left(1 + \frac{1}{y\sqrt{\frac{x-1}{x+1}}}\right)}{2\pi} + \frac{1}{2} \right\rfloor} \right) + 2\coth^{-1}\left(\frac{1 + \frac{1}{y\sqrt{\frac{x-1}{x+1}}}}{\frac{1}{\sqrt{\frac{x-1}{x+1}}\, y} - 1} \right)$$

Involving $\sin^{-1}(z)$

01.28.16.0189.01

$$\coth^{-1}(x) - \sin^{-1}(y) = i\,\pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\,\pi} \right\rfloor - 2\,i\,\pi \left(\left\lfloor \frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right) - \arg\left(\left(i\,y + \sqrt{1 - y^2}\right)^i\right) + \pi}{2\,\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2}\,\mathrm{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\,\pi} \right\rfloor + \left\lfloor \frac{\pi - \mathrm{Re}\left(\log\left(i\,y + \sqrt{1 - y^2}\right)\right)}{2\,\pi} \right\rfloor \right) + \log\left(\frac{\left(i\,y + \sqrt{1 - y^2}\right)^i}{\sqrt{\frac{x-1}{x+1}}} \right)$$

01.28.16.0190.01

$$\coth^{-1}(x) - \sin^{-1}(y) = i\,\pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\,\pi} \right\rfloor - 2\,i\,\pi \left(\left\lfloor \frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right) - \arg\left(\left(i\,y + \sqrt{1 - y^2}\right)^i\right) + \pi}{2\,\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2}\,\mathrm{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\,\pi} \right\rfloor + \left\lfloor \frac{\pi - \mathrm{Re}\left(\log\left(i\,y + \sqrt{1 - y^2}\right)\right)}{2\,\pi} \right\rfloor \right) + i\,\pi \left(1 - (-1)^{\left\lfloor \frac{\arg\left(\frac{\left(i\,y + \sqrt{1-y^2}\right)^i}{\sqrt{\frac{x-1}{x+1}}} + 1 \right)}{2\,\pi} + \frac{1}{2} \right\rfloor} \right) + 2\coth^{-1}\left(\frac{\frac{\left(i\,y + \sqrt{1-y^2}\right)^i}{\sqrt{\frac{x-1}{x+1}}} + 1}{\frac{\left(i\,y + \sqrt{1-y^2}\right)^i}{\sqrt{\frac{x-1}{x+1}}} - 1} \right)$$

01.28.16.0191.01

$$\coth^{-1}(x) - i\sin^{-1}(y) = -\frac{i\sqrt{1-\frac{1}{x^2}}\sqrt{\frac{\left(-x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\;x}{-x\,y-i\sqrt{1-y^2}}\sin^{-1}\left(\frac{\sqrt{1-y^2}-\frac{i\,y}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+$$

$$\frac{i\,\pi\sqrt{\frac{\left(-x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\sqrt{1-\frac{1}{x^2}}\;x}{2\left(-x\,y-i\sqrt{1-y^2}\right)}+i\,\pi\left(\frac{\sqrt{\frac{\left(-x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\sqrt{1-\frac{1}{x^2}}\;x}{-x\,y-i\sqrt{1-y^2}}+1\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-y^2}-i\,y\right)}{2\,\pi}\right\rfloor-$$

$$i\,\pi\left(\frac{\sqrt{1-\frac{1}{x^2}}\;x\sqrt{\frac{\left(-x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}}{-x\,y-i\sqrt{1-y^2}}-1\right)\left\lfloor-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-y^2}-i\,y\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0192.01

$$\coth^{-1}(x) - i\sin^{-1}(y) = \coth^{-1}\left(\frac{(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{-y - \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor} \left(-\frac{y}{x} - i\sqrt{1-y^2}\right)}{\sqrt{1-\frac{1}{x^2}}\,\sqrt{1 - \frac{\left(\frac{iy}{x} - \sqrt{1-y^2}\right)^2}{1-\frac{1}{x^2}}}} \right) + \frac{1}{2} i\pi \left(2\left(1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{-y - \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor}\right) \left\lfloor \frac{\arg\left(\frac{i + \frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right) + \arg\left(\sqrt{1-y^2} - iy\right)}{2\pi} \right\rfloor + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{-y - \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor} + (-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi} + \frac{\arg\left(\frac{iy}{x} - \sqrt{1-y^2}\right)}{\pi} + \frac{1}{2} \right\rfloor + \left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{-y - \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor} - 2\left(-1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{-y - \frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor}\right) \left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{i + \frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right) + \arg\left(\sqrt{1-y^2} - iy\right)}{2\pi} \right\rfloor \right)$$

Involving $\cos^{-1}(z)$

01.28.16.0193.01

$$\coth^{-1}(x)-\cos^{-1}(y)=i\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2i\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(i y+\sqrt{1-y^2}\right)^{-i}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\operatorname{Re}\left(\log\left(i y+\sqrt{1-y^2}\right)\right)+\pi}{2\pi}\right\rfloor\right)+\log\left(\frac{\left(i y+\sqrt{1-y^2}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}\right)-\frac{\pi}{2}$$

01.28.16.0194.01

$$\coth^{-1}(x)-\cos^{-1}(y)=i\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2i\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(i y+\sqrt{1-y^2}\right)^{-i}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\operatorname{Re}\left(\log\left(i y+\sqrt{1-y^2}\right)\right)+\pi}{2\pi}\right\rfloor\right)+i\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(i y+\sqrt{1-y^2}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(i y+\sqrt{1-y^2}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(i y+\sqrt{1-y^2}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)-\frac{\pi}{2}$$

01.28.16.0195.01

$$\coth^{-1}(x) - i\cos^{-1}(y) = -\frac{\pi i}{2} - \frac{i\sqrt{1-\frac{1}{x^2}}\,\sqrt{\frac{\left(x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\;x}{x\,y-i\sqrt{1-y^2}}\sin^{-1}\left(\frac{\frac{i\,y}{x}+\sqrt{1-y^2}}{\sqrt{1-\frac{1}{x^2}}}\right) +$$

$$\frac{i\,\pi\sqrt{\frac{\left(x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\,\sqrt{1-\frac{1}{x^2}}\;x}{2\left(x\,y-i\sqrt{1-y^2}\right)} + i\,\pi\left(\frac{\sqrt{\frac{\left(x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}\,\sqrt{1-\frac{1}{x^2}}\;x}{x\,y-i\sqrt{1-y^2}}+1\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)}{2\,\pi}\right\rfloor -$$

$$i\,\pi\left(\frac{\sqrt{1-\frac{1}{x^2}}\;x\sqrt{\frac{\left(x\,y-i\sqrt{1-y^2}\right)^2}{x^2-1}}}{x\,y-i\sqrt{1-y^2}}-1\right)\left\lfloor-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0196.01

$$\coth^{-1}(x)-i\cos^{-1}(y)=\coth^{-1}\left(\frac{(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(\frac{y}{x}-i\sqrt{1-y^2}\right)}{\sqrt{1-\frac{1}{x^2}}\sqrt{1-\frac{\left(-\frac{i y}{x}-\sqrt{1-y^2}\right)^2}{1-\frac{1}{x^2}}}}\right)+\frac{1}{2}i\pi$$

$$\left(-1+2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i y+\sqrt{1-y^2}\right)}{2\pi}\right\rfloor+(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(-\frac{i y}{x}-\sqrt{1-y^2}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}+\right.$$

$$\left.(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i y+\sqrt{1-y^2}\right)}{2\pi}\right\rfloor\right)$$

Involving $\tan^{-1}(z)$

01.28.16.0197.01

$$\coth^{-1}(x)-\tan^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left((1-i\,y)^{-\frac{i}{2}}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Re}(\log(1-i\,y))+\pi}{2\,\pi}\right\rfloor\right)-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\frac{(1-i\,y)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)-\arg\left((i\,y+1)^{i/2}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(\log\left(\frac{(1-i\,y)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)\right)}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\operatorname{Re}(\log(i\,y+1))}{2\,\pi}\right\rfloor\right)+\log\left(\frac{(1-i\,y)^{-\frac{i}{2}}\,(i\,y+1)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)$$

01.28.16.0198.01

$$\coth^{-1}(x)-\tan^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left((1-i\,y)^{-\frac{i}{2}}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Re}(\log(1-i\,y))+\pi}{2\,\pi}\right\rfloor\right)-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\frac{(1-i\,y)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)-\arg\left((i\,y+1)^{i/2}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(\log\left(\frac{(1-i\,y)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)\right)}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\operatorname{Re}(\log(i\,y+1))}{2\,\pi}\right\rfloor\right)+i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{(1-i\,y)^{-\frac{i}{2}}\,(i\,y+1)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{(1-i\,y)^{-\frac{i}{2}}\,(i\,y+1)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{(1-i\,y)^{-\frac{i}{2}}\,(i\,y+1)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)$$

01.28.16.0199.01

$$\coth^{-1}(x) - i\tan^{-1}(y) = -i\tan^{-1}\left(\frac{i + x\,y}{x - i\,y}\right) + i\,\pi\left\lfloor\frac{-\arg\left(1 - \frac{1}{x}\right) + \arg\left(1 - \frac{i\,y}{x}\right) - \arg(i\,y + 1) + \pi}{2\,\pi}\right\rfloor - i\,\pi\left\lfloor\frac{-\arg\left(1 + \frac{1}{x}\right) + \arg\left(1 - \frac{i\,y}{x}\right) - \arg(1 - i\,y) + \pi}{2\,\pi}\right\rfloor$$

01.28.16.0200.01

$$\coth^{-1}(x) - i\tan^{-1}(y) = \coth^{-1}\left(\frac{x - i\,y}{1 - i\,x\,y}\right) + i\,\pi\left\lfloor\frac{-\arg\left(1 - \frac{1}{x}\right) + \arg\left(1 - \frac{i\,y}{x}\right) - \arg(i\,y + 1) + \pi}{2\,\pi}\right\rfloor - \pi\,i\left\lfloor\frac{-\arg\left(1 + \frac{1}{x}\right) + \arg\left(1 - \frac{i\,y}{x}\right) - \arg(1 - i\,y) + \pi}{2\,\pi}\right\rfloor$$

Involving $\cot^{-1}(z)$

01.28.16.0201.01

$$\coth^{-1}(x) - \cot^{-1}(y) = i\,\pi\left\lfloor\frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\,\pi}\right\rfloor - 2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right) - \arg\left(\left(1 - \frac{i}{y}\right)^{-\frac{i}{2}}\right) + \pi}{2\,\pi}\right\rfloor + \left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\,\pi}\right\rfloor + \left\lfloor\frac{\frac{1}{2}\operatorname{Re}\left(\log\left(1 - \frac{i}{y}\right)\right) + \pi}{2\,\pi}\right\rfloor\right) - 2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\frac{\left(1 - \frac{i}{y}\right)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right) - \arg\left(\left(1 + \frac{i}{y}\right)^{i/2}\right) + \pi}{2\,\pi}\right\rfloor + \left\lfloor\frac{\pi - \operatorname{Im}\left(\log\left(\frac{\left(1 - \frac{i}{y}\right)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)\right)}{2\,\pi}\right\rfloor + \left\lfloor\frac{\pi - \frac{1}{2}\operatorname{Re}\left(\log\left(1 + \frac{i}{y}\right)\right)}{2\,\pi}\right\rfloor\right) + \log\left(\frac{\left(1 - \frac{i}{y}\right)^{-\frac{i}{2}}\left(1 + \frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}\right)$$

01.28.16.0202.01

$$\coth^{-1}(x)-\cot^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-$$

$$2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(1-\frac{i}{y}\right)^{-\frac{i}{2}}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Re}\left(\log\left(1-\frac{i}{y}\right)\right)+\pi}{2\,\pi}\right\rfloor\right)-$$

$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\frac{\left(1-\frac{i}{y}\right)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)-\arg\left(\left(1+\frac{i}{y}\right)^{i/2}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\mathrm{Im}\left(\log\left(\frac{\left(1-\frac{i}{y}\right)^{-\frac{i}{2}}}{\sqrt{\frac{x-1}{x+1}}}\right)\right)}{2\,\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\,\mathrm{Re}\left(\log\left(1+\frac{i}{y}\right)\right)}{2\,\pi}\right\rfloor\right)+$$

$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(1-\frac{i}{y}\right)^{-\frac{i}{2}}\left(1+\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(1-\frac{i}{y}\right)^{-\frac{i}{2}}\left(1+\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(1-\frac{i}{y}\right)^{-\frac{i}{2}}\left(1+\frac{i}{y}\right)^{i/2}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)$$

01.28.16.0203.01

$$\coth^{-1}(x)-i\cot^{-1}(y)=$$

$$-i\tan^{-1}\left(\frac{x+i\,y}{-i+x\,y}\right)+i\,\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right)-\arg\left(1+\frac{i}{y}\right)+\arg\left(1-\frac{i}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor-i\,\pi\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{i}{y}\right)+\arg\left(1-\frac{i}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor$$

01.28.16.0204.01

$$\coth^{-1}(x)-i\cot^{-1}(y)=$$

$$\coth^{-1}\left(\frac{i\,x\,y+1}{x+i\,y}\right)+i\,\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right)-\arg\left(1+\frac{i}{y}\right)+\arg\left(1-\frac{i}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor-\pi\,i\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{i}{y}\right)+\arg\left(1-\frac{i}{x\,y}\right)+\pi}{2\,\pi}\right\rfloor$$

Involving $\csc^{-1}(z)$

01.28.16.0205.01

$$\coth^{-1}(x)-\csc^{-1}(y)=i\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2i\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Re}\left(\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)}{2\pi}\right\rfloor\right)+\log\left(\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}}{\sqrt{\frac{x-1}{x+1}}}\right)$$

01.28.16.0206.01

$$\coth^{-1}(x)-\csc^{-1}(y)=i\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2i\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Re}\left(\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)}{2\pi}\right\rfloor\right)+i\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)$$

01.28.16.0207.01

$$\coth^{-1}(x) - i\csc^{-1}(y) =$$

$$\frac{i\,x\sqrt{1-\frac{1}{x^2}}\sqrt{\frac{x^2+2\,i\,y\sqrt{1-\frac{1}{y^2}}\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{x+i\,y\sqrt{1-\frac{1}{y^2}}}\sin^{-1}\left(\frac{\sqrt{1-\frac{1}{y^2}}-\frac{i}{x\,y}}{\sqrt{1-\frac{1}{x^2}}}\right)-\frac{i\,\pi\sqrt{1-\frac{1}{x^2}}\,x\sqrt{\frac{x^2+2\,i\,y\sqrt{1-\frac{1}{y^2}}\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{2\left(x+i\,y\sqrt{1-\frac{1}{y^2}}\right)}+$$

$$i\,\pi\left(1-\frac{\sqrt{1-\frac{1}{x^2}}\,x\,y\sqrt{\frac{x^2+2\,i\,y\sqrt{1-\frac{1}{y^2}}\,x-y^2+1}{(x^2-1)\,y^2}}}{x+i\,y\sqrt{1-\frac{1}{y^2}}}\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}-\frac{i}{y}\right)}{2\,\pi}\right\rfloor-$$

$$i\,\pi\left(-\frac{\sqrt{1-\frac{1}{x^2}}\,x\sqrt{\frac{x^2+2\,i\,y\sqrt{1-\frac{1}{y^2}}\,x-y^2+1}{(x^2-1)\,y^2}}\;y}{x+i\,y\sqrt{1-\frac{1}{y^2}}}-1\right)\left\lfloor-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}-\frac{i}{y}\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0208.01

$$\coth^{-1}(x) - i\csc^{-1}(y) = \coth^{-1}\left(\frac{(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}-\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(-i\sqrt{1-\frac{1}{y^2}}-\frac{1}{x\,y}\right)}{\sqrt{1-\frac{1}{x^2}}\sqrt{1-\frac{\left(\frac{i}{x\,y}-\sqrt{1-\frac{1}{y^2}}\right)^2}{1-\frac{1}{x^2}}}}\right)+\frac{1}{2}\,i\,\pi$$

$$2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\cdots\sqrt{1-\frac{1}{x^2}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}-\frac{i}{y}\right)}{2\pi}\right\rfloor+(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(\frac{i}{x\,y}-\sqrt{1-\frac{1}{y^2}}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\cdots\sqrt{1-\frac{1}{x^2}}\right)}{\pi}\right\rfloor}+$$

$$(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}-\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}-\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}-\frac{i}{y}\right)}{2\pi}\right\rfloor\Bigg)\Bigg)$$

Involving $\sec^{-1}(z)$

01.28.16.0209.01

$$\coth^{-1}(x)-\sec^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\operatorname{Re}\left(\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)+\pi}{2\,\pi}\right\rfloor\right)+\log\left(\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}\right)-\frac{\pi}{2}$$

01.28.16.0210.01

$$\coth^{-1}(x)-\sec^{-1}(y)=i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\,\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{\frac{1}{2}\arg\left(\frac{x-1}{x+1}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\,\pi}\right\rfloor+\left\lfloor\frac{\operatorname{Re}\left(\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)+\pi}{2\,\pi}\right\rfloor\right)+i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}+1\right)}{2\,\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}+1}{\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{-i}}{\sqrt{\frac{x-1}{x+1}}}-1}\right)-\frac{\pi}{2}$$

01.28.16.0211.01

$$\coth^{-1}(x) - i\sec^{-1}(y) =$$

$$-\frac{\pi i}{2} - \frac{i\sqrt{1-\frac{1}{x^2}}\; x\sqrt{\frac{x^2-2i\sqrt{1-\frac{1}{y^2}}\,y\,x-y^2+1}{(x^2-1)y^2}}\; y}{x-i\sqrt{1-\frac{1}{y^2}}\; y}\sin^{-1}\left(\frac{\sqrt{1-\frac{1}{y^2}}+\frac{i}{x\,y}}{\sqrt{1-\frac{1}{x^2}}}\right) + \frac{i\,\pi\,x\sqrt{1-\frac{1}{x^2}}\;\sqrt{\frac{x^2-2i\sqrt{1-\frac{1}{y^2}}\,y\,x-y^2+1}{(x^2-1)y^2}}\; y}{2\left(x-i\sqrt{1-\frac{1}{y^2}}\; y\right)} +$$

$$i\,\pi\left(\frac{x\sqrt{1-\frac{1}{x^2}}\;\sqrt{\frac{x^2-2i\sqrt{1-\frac{1}{y^2}}\,y\,x-y^2+1}{(x^2-1)y^2}}\; y}{x-i\sqrt{1-\frac{1}{y^2}}\; y}+1\right)\left\lfloor\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor -$$

$$\pi\,i\left(\frac{\sqrt{1-\frac{1}{x^2}}\; x\,y\sqrt{\frac{x^2-2i\sqrt{1-\frac{1}{y^2}}\,y\,x-y^2+1}{(x^2-1)y^2}}}{x-i\sqrt{1-\frac{1}{y^2}}\; y}-1\right)\left\lfloor-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)-\pi}{2\pi}\right\rfloor$$

01.28.16.0212.01

$$\coth^{-1}(x) - i\sec^{-1}(y) = \coth^{-1}\left(\frac{(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(-i\sqrt{1-\frac{1}{y^2}}+\frac{1}{x\,y}\right)}{\sqrt{1-\frac{1}{x^2}}\;\sqrt{1-\frac{\left(-\sqrt{1-\frac{1}{y^2}}-\frac{i}{x\,y}\right)^2}{1-\frac{1}{x^2}}}}\right) +$$

$$\frac{1}{2}\, i\, \pi \left(-1+2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\ldots \sqrt{1-\frac{1}{x^2}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor\right)+$$

$$(-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(-\sqrt{1-\frac{1}{y^2}}-\frac{i}{x\,y}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-$$

$$2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor\right)$$

Involving $\sinh^{-1}(z)$

01.28.16.0213.01

$$\tanh^{-1}(x) - \sinh^{-1}(y) = \frac{\sqrt{1-x^2}\,\sqrt{\frac{(y^2+1)x^2 - 2y\sqrt{y^2+1}\,x + y^2}{x^2-1}}}{x\sqrt{y^2+1} - y} \sin^{-1}\left(\frac{\sqrt{y^2+1} - x\,y}{\sqrt{1-x^2}}\right) -$$

$$i\,\pi\left(1 - \frac{i\sqrt{1-x^2}\,\sqrt{\frac{(y^2+1)x^2 - 2y\sqrt{y^2+1}\,x + y^2}{x^2-1}}}{x\sqrt{y^2+1} - y}\right)\left\lfloor \frac{\arg\left(\frac{i - i\,x}{\sqrt{1-x^2}}\right) + \arg\left(y + \sqrt{y^2+1}\right)}{2\pi} \right\rfloor -$$

$$i\,\pi\left(1 + \frac{i\sqrt{1-x^2}\,\sqrt{\frac{(y^2+1)x^2 - 2y\sqrt{y^2+1}\,x + y^2}{x^2-1}}}{x\sqrt{y^2+1} - y}\right)\left\lfloor -\frac{\arg\left(\frac{i - i\,x}{\sqrt{1-x^2}}\right) + \arg\left(y + \sqrt{y^2+1}\right) - \pi}{2\pi} \right\rfloor -$$

$$\frac{\pi\sqrt{1-x^2}\,\sqrt{\frac{(y^2+1)x^2 - 2y\sqrt{y^2+1}\,x + y^2}{x^2-1}}}{2\left(x\sqrt{y^2+1} - y\right)}$$

01.28.16.0214.01

$$\coth^{-1}(x)-\sinh^{-1}(y)=\coth^{-1}\left(\frac{i\,(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{y^2+1}}{x}-i\,y}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(\sqrt{y^2+1}\,-\frac{y}{x}\right)}{\sqrt{1-\frac{1}{x^2}}\,\sqrt{1-\frac{\left(\sqrt{y^2+1}\,-\frac{y}{x}\right)^2}{1-\frac{1}{x^2}}}}\right)-$$

$$\frac{1}{2}\,i\,\pi\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{y^2+1}}{x}-i\,y}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{\arg\left(y+\sqrt{y^2+1}\right)+\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{2\,\pi}\right\rfloor+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{y^2+1}}{x}-i\,y}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}+\right.$$

$$\left.(-1)^{\left\lfloor\frac{\arg\left(\frac{y}{x}-\sqrt{y^2+1}\right)}{\pi}+\frac{1}{2}-\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\,\pi}\right\rfloor+\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{y^2+1}}{x}-i\,y}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{y^2+1}}{x}-i\,y}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{1}{2}-\frac{\arg\left(y+\sqrt{y^2+1}\right)+\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{2\,\pi}\right\rfloor\right)$$

Involving $\cosh^{-1}(z)$

01.28.16.0215.01

$$\coth^{-1}(x)-\cosh^{-1}(y)=\coth^{-1}\left(\frac{(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{\sqrt{y-1}\,\sqrt{y+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(\frac{y}{x}-\sqrt{y-1}\,\sqrt{y+1}\right)}{\sqrt{1-\frac{1}{x^2}}\,\sqrt{\frac{\left(\sqrt{y-1}\,\sqrt{y+1}-\frac{y}{x}\right)^2}{1-\frac{1}{x^2}}+1}}\right)-$$

$$\frac{1}{4}\,i\left(1-(-1)^{-\left\lfloor -\frac{\arg(1-y)}{2\pi}\right\rfloor}\right)\pi\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y+\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)}{2\pi}\right\rfloor+\right.$$

$$\left.(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y+\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y+\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)}{2\pi}\right\rfloor-1\right)+$$

$$\frac{1}{4}\, i \left(1+(-1)^{-\left\lfloor -\frac{\arg(1-y)}{2\pi}\right\rfloor}\right) \pi \left(2 \left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right) \left\lfloor \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)}{2\pi} \right\rfloor + \right.$$

$$\left. (-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor} - 2 \left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{i\sqrt{1-y^2}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right) \left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(i\,y+\sqrt{1-y^2}\right)}{2\pi} \right\rfloor - 1 \right) +$$

$$\frac{1}{2}\, i\, (-1)^{\left\lfloor \frac{\arg\left(i\sqrt{y-1}\,\sqrt{y+1}-\frac{i\,y}{x}\right)}{\pi}+\frac{1}{2}-\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}\right\rfloor + \left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{y-\frac{\sqrt{y-1}\,\sqrt{y+1}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor} \pi$$

Involving $\tanh^{-1}(z)$

01.28.16.0014.01

$$\coth^{-1}(x)-\tanh^{-1}(y) = \tanh^{-1}\left(\frac{1-x\,y}{x-y}\right) - \frac{\pi\,i}{2}\operatorname{sgn}(1-x\,y)\,(1-\operatorname{sgn}(x-y)) \;/;\; x>1 \lor |y|<1 \land x>0 \lor y<-1 \land -1<x<0$$

01.28.16.0015.01

$$\coth^{-1}(x)-\tanh^{-1}(y) = \tanh^{-1}\left(\frac{1-x\,y}{x-y}\right) + \frac{\pi\,i}{2}(\operatorname{sgn}(x-y)+1)\operatorname{sgn}(1-x\,y) \;/;\; (x<-1 \lor |y|<1 \land x<0) \lor y>1 \land 0<x<1$$

01.28.16.0016.01

$$\coth^{-1}(x)-\tanh^{-1}(y)=\tanh^{-1}\left(\frac{1-x\,y}{x-y}\right)-i\,\pi\,\mathrm{sgn}\left(\frac{1-x\,y}{x-y}\right)\,/;\,y<-1\land 0<x<1\lor y>1\land -1<x<0$$

01.28.16.0216.01

$$\coth^{-1}(x)-\tanh^{-1}(y)=-\tanh^{-1}\left(\frac{x\,y-1}{x-y}\right)-i\,\pi\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)+\arg\left(1-\frac{y}{x}\right)-\arg(1-y)+\pi}{2\,\pi}\right\rfloor+i\,\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right)+\arg\left(1-\frac{y}{x}\right)-\arg(y+1)+\pi}{2\,\pi}\right\rfloor$$

01.28.16.0217.01

$$\coth^{-1}(x)-\tanh^{-1}(y)=\coth^{-1}\left(\frac{x-y}{1-x\,y}\right)-\pi\,i\left\lfloor\frac{-\arg\left(1+\frac{1}{x}\right)+\arg\left(1-\frac{y}{x}\right)-\arg(1-y)+\pi}{2\,\pi}\right\rfloor+i\,\pi\left\lfloor\frac{-\arg\left(1-\frac{1}{x}\right)+\arg\left(1-\frac{y}{x}\right)-\arg(y+1)+\pi}{2\,\pi}\right\rfloor$$

Involving $\operatorname{csch}^{-1}(z)$

01.28.16.0218.01

$$\coth^{-1}(x)-\operatorname{csch}^{-1}(y)=-\frac{\sqrt{1-\frac{1}{x^2}}\,x\sqrt{-\frac{x^2-2\sqrt{1+\frac{1}{y^2}}\,y\,x+y^2+1}{(x^2-1)\,y^2}}\,y}{x-\sqrt{1+\frac{1}{y^2}}\,y}\sin^{-1}\left(\frac{\sqrt{1+\frac{1}{y^2}}-\frac{1}{x\,y}}{\sqrt{1-\frac{1}{x^2}}}\right)+\frac{\pi\,x\sqrt{1-\frac{1}{x^2}}\sqrt{-\frac{x^2-2\sqrt{1+\frac{1}{y^2}}\,y\,x+y^2+1}{(x^2-1)\,y^2}}\,y}{2\left(x-\sqrt{1+\frac{1}{y^2}}\,y\right)}-$$

$$i\,\pi\left(\frac{i\,x\sqrt{1-\frac{1}{x^2}}\sqrt{-\frac{x^2-2\sqrt{1+\frac{1}{y^2}}\,y\,x+y^2+1}{(x^2-1)\,y^2}}\,y}{x-\sqrt{1+\frac{1}{y^2}}\,y}+1\right)\left\lfloor\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)}{2\,\pi}\right\rfloor+$$

$$i\,\pi\left(\frac{i\sqrt{1-\frac{1}{x^2}}\,x\,y\sqrt{-\frac{x^2-2\sqrt{1+\frac{1}{y^2}}\,y\,x+y^2+1}{(x^2-1)\,y^2}}}{x-\sqrt{1+\frac{1}{y^2}}\,y}-1\right)\left\lfloor\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)-\pi}{2\,\pi}\right\rfloor$$

01.28.16.0219.01

$$\left(\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}-\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor\right.$$

$$\coth^{-1}(x)-\operatorname{csch}^{-1}(y)=\coth^{-1}\left(\frac{i\,(-1)^{\left\lfloor\quad\right\rfloor}\left(\sqrt{1+\frac{1}{y^2}}-\frac{1}{x\,y}\right)}{\sqrt{1-\frac{1}{x^2}}\,\sqrt{1-\frac{\left(\sqrt{1+\frac{1}{y^2}}-\frac{1}{x\,y}\right)^2}{1-\frac{1}{x^2}}}}\right)-$$

$$\frac{1}{2}\,i\,\pi\Bigg(2\left(1+(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}-\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)}{2\pi}\right\rfloor+(-1)^{\left\lfloor-\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(\frac{1}{x\,y}-\sqrt{1+\frac{1}{y^2}}\right)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}-\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}+$$

$$(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}-\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}-2\left(-1+(-1)^{\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1+\frac{1}{y^2}}}{x}-\frac{i}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{1}{2}-\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)}{2\pi}\right\rfloor\Bigg)$$

Involving $\text{sech}^{-1}(z)$

01.28.16.0220.01

$$\coth^{-1}(x)-\text{sech}^{-1}(y)=\coth^{-1}\left(\frac{(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\left(\frac{1}{x\,y}-\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}\right)}{\sqrt{1-\frac{1}{x^2}}\,\sqrt{\frac{\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}-\frac{1}{x\,y}\right)^2}{1-\frac{1}{x^2}}+1}}\right)-$$

$$\frac{1}{4}\,i\left(1-(-1)^{-\left\lfloor -\frac{\arg\left(1-\frac{1}{y}\right)}{2\pi}\right\rfloor}\right)\pi\left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{i\sqrt{1-\frac{1}{y^2}}}{x}+\frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right)\left\lfloor\frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor\right)+$$

$$(-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{\frac{i\sqrt{1-\frac{1}{y^2}}}{x} + \frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor} - 2\left(-1 + (-1)^{\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{\frac{i\sqrt{1-\frac{1}{y^2}}}{x} + \frac{1}{y}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi} \right\rfloor}\right)\left(\left\lfloor \frac{1}{2} - \frac{\arg\left(\frac{i-\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right) + \arg\left(\sqrt{1-\frac{1}{y^2}} + \frac{i}{y}\right)}{2\pi} \right\rfloor - 1\right) +$$

$$\frac{1}{4}\, i \left(1+(-1)^{-\left\lfloor -\frac{\arg\left(1-\frac{1}{y}\right)}{2\pi}\right\rfloor}\right) \pi \left(2\left(1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right) \left\lfloor \frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor + \right.$$

$$\left. (-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor} - 2\left(-1+(-1)^{\left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{i\sqrt{1-\frac{1}{y^2}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor}\right) \left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{i+\frac{i}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)+\arg\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)}{2\pi}\right\rfloor - 1\right) +$$

$$\frac{1}{2}\, i\, (-1)^{\left\lfloor -\frac{\arg\left(1-\frac{1}{x^2}\right)}{2\pi}+\frac{\arg\left(i\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}-\frac{i}{x\,y}\right)}{\pi}+\frac{1}{2}\right\rfloor + \left\lfloor \frac{1}{2}-\frac{\arg\left(\frac{\frac{1}{y}-\frac{\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}}{x}}{\sqrt{1-\frac{1}{x^2}}}\right)}{\pi}\right\rfloor} \pi$$

Linear combinations involving the direct function

Involving log(*z*)

01.28.16.0221.01

$$a\coth^{-1}(x)+b\log(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(y^b\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}(b\log(y))}{2\pi}\right\rfloor\right)+\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}y^b\right)$$

01.28.16.0222.01

$$a\coth^{-1}(x)+b\log(y)=$$
$$a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(y^b\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}(b\log(y))}{2\pi}\right\rfloor\right)+$$
$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(y^b\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{y^b\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}y^b-1}\right)$$

Involving $\sin^{-1}$(*z*)

01.28.16.0223.01

$$a\coth^{-1}(x)+b\sin^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(i\,y+\sqrt{1-y^2}\right)^{-i\,b}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\operatorname{Re}\left(b\log\left(i\,y+\sqrt{1-y^2}\right)\right)+\pi}{2\pi}\right\rfloor\right)+$$
$$\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(i\,y+\sqrt{1-y^2}\right)^{-i\,b}\right)$$

01.28.16.0224.01

$$a \coth^{-1}(x) + b \sin^{-1}(y) = a\, i\, \pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\pi} \right\rfloor - 2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right) - \arg\left(\left(i\, y + \sqrt{1-y^2}\right)^{-i\, b}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Im}\left(a \log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\operatorname{Re}\left(b \log\left(i\, y + \sqrt{1-y^2}\right)\right) + \pi}{2\pi} \right\rfloor \right) + i\, \pi \left(1 - (-1)^{\left\lfloor \frac{\arg\left(\left(i\, y + \sqrt{1-y^2}\right)^{-i\, b} \left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} + 1\right)}{2\pi} + \frac{1}{2} \right\rfloor} \right) + 2 \coth^{-1}\left(\frac{\left(i\, y + \sqrt{1-y^2}\right)^{-i\, b} \left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} + 1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(i\, y + \sqrt{1-y^2}\right)^{-i\, b} - 1} \right)$$

Involving $\cos^{-1}(z)$

01.28.16.0225.01

$$a \coth^{-1}(x) + b \cos^{-1}(y) = \frac{\pi\, b}{2} + a\, i\, \pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\pi} \right\rfloor - 2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right) - \arg\left(\left(i\, y + \sqrt{1-y^2}\right)^{i\, b}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Im}\left(a \log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \operatorname{Re}\left(b \log\left(i\, y + \sqrt{1-y^2}\right)\right)}{2\pi} \right\rfloor \right) + \log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(i\, y + \sqrt{1-y^2}\right)^{i\, b} \right)$$

01.28.16.0226.01

$$a \coth^{-1}(x) + b \cos^{-1}(y) = \frac{\pi\, b}{2} + a\, i\, \pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\pi} \right\rfloor - 2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right) - \arg\left(\left(i\, y + \sqrt{1-y^2}\right)^{i\, b}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Im}\left(a \log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \operatorname{Re}\left(b \log\left(i\, y + \sqrt{1-y^2}\right)\right)}{2\pi} \right\rfloor \right) + i\, \pi \left(1 - (-1)^{\left\lfloor \frac{\arg\left(\left(i\, y + \sqrt{1-y^2}\right)^{i\, b} \left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} + 1\right)}{2\pi} + \frac{1}{2} \right\rfloor} \right) + 2 \coth^{-1}\left(\frac{\left(i\, y + \sqrt{1-y^2}\right)^{i\, b} \left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} + 1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(i\, y + \sqrt{1-y^2}\right)^{i\, b} - 1} \right)$$

Involving $\tan^{-1}(z)$

01.28.16.0227.01

$$a\coth^{-1}(x)+b\tan^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left((i\,y+1)^{-\frac{1}{2}(i\,b)}\right)-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}(1-i\,y)^{\frac{i\,b}{2}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Re}(b\log(i\,y+1))+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}(1-i\,y)^{\frac{i\,b}{2}}\right)\right)}{2\pi}\right\rfloor\right)-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left((1-i\,y)^{\frac{i\,b}{2}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\operatorname{Re}(b\log(1-i\,y))}{2\pi}\right\rfloor\right)+\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}(1-i\,y)^{\frac{i\,b}{2}}(i\,y+1)^{-\frac{1}{2}(i\,b)}\right)$$

01.28.16.0228.01

$$a\coth^{-1}(x)+b\tan^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left((i\,y+1)^{-\frac{1}{2}(i\,b)}\right)-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}(1-i\,y)^{\frac{i\,b}{2}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Re}(b\log(i\,y+1))+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}(1-i\,y)^{\frac{i\,b}{2}}\right)\right)}{2\pi}\right\rfloor\right)-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left((1-i\,y)^{\frac{i\,b}{2}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\operatorname{Re}(b\log(1-i\,y))}{2\pi}\right\rfloor\right)+i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}(i\,y+1)^{-\frac{1}{2}(i\,b)}(1-i\,y)^{\frac{i\,b}{2}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}(i\,y+1)^{-\frac{1}{2}(i\,b)}(1-i\,y)^{\frac{i\,b}{2}}+1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}(1-i\,y)^{\frac{i\,b}{2}}(i\,y+1)^{-\frac{1}{2}(i\,b)}-1}\right)$$

Involving $\cot^{-1}(z)$

01.28.16.0229.01

$$a \coth^{-1}(x) + b \cot^{-1}(y) = a\, i\, \pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\pi} \right\rfloor -$$

$$2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(i\, b)}\right) - \arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Re}\left(b \log\left(1 + \frac{i}{y}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \operatorname{Im}\left(\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}}\right)\right)}{2\pi} \right\rfloor \right) -$$

$$2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right) - \arg\left(\left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Im}\left(a \log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \frac{1}{2} \operatorname{Re}\left(b \log\left(1 - \frac{i}{y}\right)\right)}{2\pi} \right\rfloor \right) +$$

$$\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}} \left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(i\, b)} \right)$$

01.28.16.0230.01

$$a \coth^{-1}(x) + b \cot^{-1}(y) = a\, i\, \pi \left\lfloor \frac{\arg\left(1 + \frac{1}{x}\right) - \arg\left(1 - \frac{1}{x}\right) + \pi}{2\pi} \right\rfloor -$$

$$2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(i\, b)}\right) - \arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Re}\left(b \log\left(1 + \frac{i}{y}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \operatorname{Im}\left(\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}}\right)\right)}{2\pi} \right\rfloor \right) -$$

$$2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right) - \arg\left(\left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2} \operatorname{Im}\left(a \log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \frac{1}{2} \operatorname{Re}\left(b \log\left(1 - \frac{i}{y}\right)\right)}{2\pi} \right\rfloor \right) +$$

$$i\, \pi \left(1 - (-1)^{\left\lfloor \frac{\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(i\, b)} \left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}} + 1\right)}{2\pi} + \frac{1}{2} \right\rfloor} \right) + 2 \coth^{-1}\left(\frac{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(i\, b)} \left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}} + 1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} \left(1 - \frac{i}{y}\right)^{\frac{i\, b}{2}} \left(1 + \frac{i}{y}\right)^{-\frac{1}{2}(i\, b)} - 1} \right)$$

Involving $\sec^{-1}(z)$

01.28.16.0231.01

$$a\coth^{-1}(x)+b\sec^{-1}(y)=\frac{\pi b}{2}+a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i b}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Re}\left(b\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)}{2\pi}\right\rfloor\right\rfloor\right)+$$
$$\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i b}\right)$$

01.28.16.0232.01

$$a\coth^{-1}(x)+b\sec^{-1}(y)=\frac{\pi b}{2}+a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i b}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Re}\left(b\log\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)\right)}{2\pi}\right\rfloor\right\rfloor\right)+$$
$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i b}\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i b}\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(\sqrt{1-\frac{1}{y^2}}+\frac{i}{y}\right)^{i b}-1}\right)$$

Involving $\sinh^{-1}(z)$

01.28.16.0233.01

$$a\coth^{-1}(x)+b\sinh^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(y+\sqrt{y^2+1}\right)^{b}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(b\log\left(y+\sqrt{y^2+1}\right)\right)}{2\pi}\right\rfloor\right\rfloor\right)+$$
$$\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(y+\sqrt{y^2+1}\right)^{b}\right)$$

01.28.16.0234.01

$$a\coth^{-1}(x)+b\sinh^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(y+\sqrt{y^2+1}\right)^b\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(b\log\left(y+\sqrt{y^2+1}\right)\right)}{2\pi}\right\rfloor\right)+$$
$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\left(y+\sqrt{y^2+1}\right)^b\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\left(y+\sqrt{y^2+1}\right)^b\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(y+\sqrt{y^2+1}\right)^b-1}\right)$$

Involving $\cosh^{-1}(z)$

01.28.16.0235.01

$$a\coth^{-1}(x)+b\cosh^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2\,i\,\pi$$
$$\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(y+\sqrt{y-1}\,\sqrt{y+1}\right)^b\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(b\log\left(y+\sqrt{y-1}\,\sqrt{y+1}\right)\right)}{2\pi}\right\rfloor\right)+$$
$$\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(y+\sqrt{y-1}\,\sqrt{y+1}\right)^b\right)$$

01.28.16.0236.01

$$a\coth^{-1}(x)+b\cosh^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2\,i\,\pi$$
$$\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(y+\sqrt{y-1}\,\sqrt{y+1}\right)^b\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(b\log\left(y+\sqrt{y-1}\,\sqrt{y+1}\right)\right)}{2\pi}\right\rfloor\right)+$$
$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\left(y+\sqrt{y-1}\,\sqrt{y+1}\right)^b\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\left(y+\sqrt{y-1}\,\sqrt{y+1}\right)^b\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(y+\sqrt{y-1}\,\sqrt{y+1}\right)^b-1}\right)$$

Involving $\tanh^{-1}(z)$

01.28.16.0237.01

$$a \coth^{-1}(x) + b \tanh^{-1}(y) = a\, i\, \pi \left\lfloor \frac{\arg\left(1+\frac{1}{x}\right) - \arg\left(1-\frac{1}{x}\right) + \pi}{2\pi} \right\rfloor - 2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right) - \arg\left((1-y)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2}\operatorname{Im}\left(a \log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2}\operatorname{Im}(b \log(1-y)) + \pi}{2\pi} \right\rfloor \right) - 2\, i\, \pi \left(\left\lfloor \frac{-\arg\left((y+1)^{b/2}\right) - \arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} (1-y)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \frac{1}{2}\operatorname{Im}(b \log(y+1))}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \operatorname{Im}\left(\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} (1-y)^{-\frac{b}{2}}\right)\right)}{2\pi} \right\rfloor \right) + \log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} (1-y)^{-\frac{b}{2}} (y+1)^{b/2}\right)$$

01.28.16.0238.01

$$a \coth^{-1}(x) + b \tanh^{-1}(y) = a\, i\, \pi \left\lfloor \frac{\arg\left(1+\frac{1}{x}\right) - \arg\left(1-\frac{1}{x}\right) + \pi}{2\pi} \right\rfloor - 2\, i\, \pi \left(\left\lfloor \frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right) - \arg\left((1-y)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2}\operatorname{Im}\left(a \log\left(\frac{x-1}{x+1}\right)\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\frac{1}{2}\operatorname{Im}(b \log(1-y)) + \pi}{2\pi} \right\rfloor \right) - 2\, i\, \pi \left(\left\lfloor \frac{-\arg\left((y+1)^{b/2}\right) - \arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} (1-y)^{-\frac{b}{2}}\right) + \pi}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \frac{1}{2}\operatorname{Im}(b \log(y+1))}{2\pi} \right\rfloor + \left\lfloor \frac{\pi - \operatorname{Im}\left(\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} (1-y)^{-\frac{b}{2}}\right)\right)}{2\pi} \right\rfloor \right) + i\, \pi \left(1 - (-1)^{\left\lfloor \frac{\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} (1-y)^{-\frac{b}{2}} (y+1)^{b/2} + 1\right)}{2\pi} + \frac{1}{2} \right\rfloor} \right) + 2 \coth^{-1}\left(\frac{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} (1-y)^{-\frac{b}{2}} (y+1)^{b/2} + 1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}} (1-y)^{-\frac{b}{2}} (y+1)^{b/2} - 1} \right)$$

Involving $\coth^{-1}(z)$

01.28.16.0239.01

$$a\coth^{-1}(x)+b\coth^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(b\log\left(1-\frac{1}{y}\right)\right)+\pi}{2\pi}\right\rfloor\right)-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(1+\frac{1}{y}\right)^{b/2}\right)-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\operatorname{Im}\left(b\log\left(1+\frac{1}{y}\right)\right)}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)\right)}{2\pi}\right\rfloor\right)+$$
$$\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\left(1+\frac{1}{y}\right)^{b/2}\right)$$

01.28.16.0240.01

$$a\coth^{-1}(x)+b\coth^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(b\log\left(1-\frac{1}{y}\right)\right)+\pi}{2\pi}\right\rfloor\right)-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(1+\frac{1}{y}\right)^{b/2}\right)-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\frac{1}{2}\operatorname{Im}\left(b\log\left(1+\frac{1}{y}\right)\right)}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\right)\right)}{2\pi}\right\rfloor\right)+$$
$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\left(1+\frac{1}{y}\right)^{b/2}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\left(1+\frac{1}{y}\right)^{b/2}+1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(1-\frac{1}{y}\right)^{-\frac{b}{2}}\left(1+\frac{1}{y}\right)^{b/2}-1}\right)$$

Involving $\operatorname{csch}^{-1}(z)$

01.28.16.0241.01

$$a\coth^{-1}(x)+b\operatorname{csch}^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)^{b}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(b\log\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)\right)}{2\pi}\right\rfloor\right)+$$
$$\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)^{b}\right)$$

01.28.16.0242.01

$$a\coth^{-1}(x)+b\operatorname{csch}^{-1}(y)=a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-$$
$$2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)^{b}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\operatorname{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\pi-\operatorname{Im}\left(b\log\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)\right)}{2\pi}\right\rfloor\right)+$$
$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)^{b}\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)^{b}\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(\sqrt{1+\frac{1}{y^2}}+\frac{1}{y}\right)^{b}-1}\right)$$

Involving $\operatorname{sech}^{-1}(z)$

01.28.16.0243.01

$$a\coth^{-1}(x)+b\,\mathrm{sech}^{-1}(y)=$$
$$a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{y}\right)^{b}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\right.$$
$$\left.\left\lfloor\frac{\pi-\mathrm{Im}\left(b\log\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{y}\right)\right)}{2\pi}\right\rfloor\right)+\log\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{y}\right)^{b}\right)$$

01.28.16.0244.01

$$a\coth^{-1}(x)+b\,\mathrm{sech}^{-1}(y)=$$
$$a\,i\,\pi\left\lfloor\frac{\arg\left(1+\frac{1}{x}\right)-\arg\left(1-\frac{1}{x}\right)+\pi}{2\pi}\right\rfloor-2\,i\,\pi\left(\left\lfloor\frac{-\arg\left(\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\right)-\arg\left(\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{y}\right)^{b}\right)+\pi}{2\pi}\right\rfloor+\left\lfloor\frac{\frac{1}{2}\,\mathrm{Im}\left(a\log\left(\frac{x-1}{x+1}\right)\right)+\pi}{2\pi}\right\rfloor+\right.$$
$$\left.\left\lfloor\frac{\pi-\mathrm{Im}\left(b\log\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{y}\right)\right)}{2\pi}\right\rfloor\right)+$$
$$i\,\pi\left(1-(-1)^{\left\lfloor\frac{\arg\left(\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{y}\right)^{b}\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1\right)}{2\pi}+\frac{1}{2}\right\rfloor}\right)+2\coth^{-1}\left(\frac{\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{y}\right)^{b}\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}+1}{\left(\frac{x-1}{x+1}\right)^{-\frac{a}{2}}\left(\sqrt{\frac{1}{y}-1}\,\sqrt{1+\frac{1}{y}}+\frac{1}{y}\right)^{b}-1}\right)$$

Identities

Functional identities

01.28.17.0001.01

$$\coth(w(z_1)+w(z_2))=\frac{1+z_1\,z_2}{z_1+z_2}\;/;\;w(z)=\coth^{-1}(z)$$

Complex characteristics

Real part

01.28.19.0001.01

$$\operatorname{Re}\left(\coth^{-1}(x+i\,y)\right) = \frac{1}{4}\log\left(\frac{(x+1)^2+y^2}{(x-1)^2+y^2}\right) /;\ x^2+y^2 \neq 1$$

01.28.19.0002.01

$$\operatorname{Re}\left(\coth^{-1}(x+i\,y)\right) = \frac{1}{4}\left(\log\left(\frac{x^2+2\,x+y^2+1}{x^2+y^2}\right) - \log\left(\frac{x^2-2\,x+y^2+1}{x^2+y^2}\right)\right)$$

Imaginary part

01.28.19.0003.01

$$\operatorname{Im}\left(\coth^{-1}(x+i\,y)\right) = -\frac{1}{2}\left(\tan^{-1}\left(\frac{2\,y}{x^2+y^2-1}\right) + \frac{\pi}{2}\left(\operatorname{sgn}\left(1-x^2-y^2\right)+1\right)\operatorname{sgn}(y)\right) /;\ x^2+y^2 \neq 1$$

01.28.19.0004.01

$$\operatorname{Im}\left(\coth^{-1}(x+i\,y)\right) = \frac{1}{2}\left(\tan^{-1}\left(\frac{x}{x^2+y^2}+1,\ -\frac{y}{x^2+y^2}\right) - \tan^{-1}\left(1-\frac{x}{x^2+y^2},\ \frac{y}{x^2+y^2}\right)\right)$$

Absolute value

01.28.19.0005.01

$$\left|\coth^{-1}(x+i\,y)\right| = \frac{1}{2}\sqrt{\left(\left(\tan^{-1}\left(1-\frac{x}{x^2+y^2},\ \frac{y}{x^2+y^2}\right) - \tan^{-1}\left(\frac{x}{x^2+y^2}+1,\ -\frac{y}{x^2+y^2}\right)\right)^2 + \frac{1}{4}\left(\log\left(\frac{x^2-2\,x+y^2+1}{x^2+y^2}\right) - \log\left(\frac{x^2+2\,x+y^2+1}{x^2+y^2}\right)\right)^2\right)}$$

Argument

01.28.19.0006.01

$$\arg\left(\coth^{-1}(x+i\,y)\right) = \tan^{-1}\left(\log\left(\frac{x^2+2\,x+y^2+1}{x^2+y^2}\right) - \log\left(\frac{x^2-2\,x+y^2+1}{x^2+y^2}\right),\ 2\tan^{-1}\left(\frac{x}{x^2+y^2}+1,\ -\frac{y}{x^2+y^2}\right) - 2\tan^{-1}\left(1-\frac{x}{x^2+y^2},\ \frac{y}{x^2+y^2}\right)\right)$$

Conjugate value

01.28.19.0007.01

$$\overline{\coth^{-1}(x+i\,y)} = \frac{1}{4}\left(-2\,i\tan^{-1}\left(\frac{x}{x^2+y^2}+1,\ -\frac{y}{x^2+y^2}\right) + 2\,i\tan^{-1}\left(1-\frac{x}{x^2+y^2},\ \frac{y}{x^2+y^2}\right) + \log\left(\frac{x^2+2\,x+y^2+1}{x^2+y^2}\right) - \log\left(\frac{x^2-2\,x+y^2+1}{x^2+y^2}\right)\right)$$

Signum value

01.28.19.0008.01

$$\operatorname{sgn}\left(\coth^{-1}(x+i\,y)\right) = \left(2\,i\tan^{-1}\left(\frac{x}{x^2+y^2}+1,\,-\frac{y}{x^2+y^2}\right)-2\,i\tan^{-1}\left(1-\frac{x}{x^2+y^2},\,\frac{y}{x^2+y^2}\right)+\log\left(\frac{x^2+2\,x+y^2+1}{x^2+y^2}\right)-\log\left(\frac{x^2-2\,x+y^2+1}{x^2+y^2}\right)\right)\Big/ \left(2\sqrt{\left(\left(\tan^{-1}\left(1-\frac{x}{x^2+y^2},\,\frac{y}{x^2+y^2}\right)-\tan^{-1}\left(\frac{x}{x^2+y^2}+1,\,-\frac{y}{x^2+y^2}\right)\right)^2+\frac{1}{4}\left(\log\left(\frac{x^2-2\,x+y^2+1}{x^2+y^2}\right)-\log\left(\frac{x^2+2\,x+y^2+1}{x^2+y^2}\right)\right)^2\right)}\right)$$

Differentiation

Low-order differentiation

01.28.20.0001.01

$$\frac{\partial\coth^{-1}(z)}{\partial z} = \frac{1}{1-z^2}$$

01.28.20.0002.01

$$\frac{\partial^2\coth^{-1}(z)}{\partial z^2} = \frac{2\,z}{\left(1-z^2\right)^2}$$

Symbolic differentiation

01.28.20.0005.01

$$\frac{\partial^n\coth^{-1}(z)}{\partial z^n} = \coth^{-1}(z)\,\delta_n+\sum_{k=0}^{n-1}\frac{k!\,(2\,k-n+2)_{2\,(n-k)-2}\left(1-z^2\right)^{-k-1}}{(n-k-1)!\,(2\,z)^{n-2\,k-1}} \,/;\, n\in\mathbb{N}$$

01.28.20.0006.01

$$\frac{\partial^n\coth^{-1}(z)}{\partial z^n} = \frac{(n-1)!}{2}\left((1-z)^{-n}+(-1)^{n-1}\,(z+1)^{-n}\right) /;\, n\in\mathbb{N}^+$$

01.28.20.0007.01

$$\frac{\partial^n\coth^{-1}(z)}{\partial z^n} = \frac{(n-1)!}{2\left(1-z^2\right)^n}\sum_{k=0}^{n}\binom{n}{k}\left(1+(-1)^{k+n-1}\right)z^k \,/;\, n\in\mathbb{N}^+$$

01.28.20.0003.02

$$\frac{\partial^n\coth^{-1}(z)}{\partial z^n} = \frac{\sqrt{\pi}\;z^{1-n}}{2^{1-n}}\,{}_3\tilde{F}_2\left(\frac{1}{2},\,1,\,1;\,1-\frac{n}{2},\,\frac{3-n}{2};\,z^2\right) /;\, n\in\mathbb{N}$$

01.28.20.0008.01

$$\frac{\partial^{2\,n+1}\coth^{-1}(z)}{\partial z^{2\,n+1}} = (2\,n)!\left(1-z^2\right)^{-n-\frac{1}{2}}\,T_{2\,n+1}\left(\frac{1}{\sqrt{1-z^2}}\right) /;\, n\in\mathbb{N}$$

Brychkov Yu.A. (2006)

01.28.20.0009.01

$$\frac{\partial^{2n}\coth^{-1}(z)}{\partial z^{2n}} = (2n-1)!\,z\left(1-z^2\right)^{-n-\frac{1}{2}}U_{2n-1}\left(\frac{1}{\sqrt{1-z^2}}\right)/;\,n\in\mathbb{N}^+$$

Brychkov Yu.A. (2006)

Fractional integro-differentiation

01.28.20.0004.01

$$\frac{\partial^{\alpha}\coth^{-1}(z)}{\partial z^{\alpha}} = 2^{\alpha-1}\left(z^{1-\alpha}\sqrt{\pi}\;{}_3\tilde{F}_2\left(\frac{1}{2},1,1;1-\frac{\alpha}{2},\frac{3}{2}-\frac{\alpha}{2};z^2\right)-\frac{\pi z^{1-\alpha}}{2\,\Gamma(1-\alpha)}\sqrt{-\frac{1}{z^2}}\right)$$

Integration

Indefinite integration

Involving only one direct function

01.28.21.0001.01

$$\int\coth^{-1}(b+az)\,dz = \frac{(b+az)\coth^{-1}(b+az)}{a}+\frac{\log\left((b+az)^2-1\right)}{2a}$$

01.28.21.0002.01

$$\int\coth^{-1}(az)\,dz = z\coth^{-1}(az)+\frac{\log\left(a^2z^2-1\right)}{2a}$$

01.28.21.0003.01

$$\int\coth^{-1}(z)\,dz = z\coth^{-1}(z)+\frac{1}{2}\log\left(z^2-1\right)$$

Involving one direct function and elementary functions

Involving power function

Involving power

Linear argument

01.28.21.0004.01

$$\int z^{\alpha-1}\coth^{-1}(az)\,dz = \frac{z^{\alpha}}{\alpha(\alpha+1)}\left((\alpha+1)\coth^{-1}(az)-az\;{}_2F_1\left(\frac{\alpha+1}{2},1;\frac{\alpha+3}{2};a^2z^2\right)\right)$$

01.28.21.0005.01

$$\int z^{\alpha-1}\coth^{-1}(z)\,dz = \frac{z^{\alpha}\coth^{-1}(z)}{\alpha}-\frac{z^{\alpha+1}}{\alpha(\alpha+1)}\;{}_2F_1\left(\frac{\alpha+1}{2},1;\frac{\alpha+3}{2};z^2\right)$$

01.28.21.0006.01

$$\int z^n \coth^{-1}(z)\,dz = -\frac{z^{n+1}}{2(n+1)}\left(z\,\Phi\left(z^2, 1, \frac{n}{2}+1\right) - 2\coth^{-1}(z)\right)$$

01.28.21.0007.01

$$\int \frac{\coth^{-1}(a z)}{\sqrt{z}}\,dz = \frac{1}{\sqrt{a}}\left(2\sqrt{a}\sqrt{z}\coth^{-1}(a z) + 2\tan^{-1}\left(\sqrt{a}\sqrt{z}\right) + \log\left(\sqrt{a}\sqrt{z} - 1\right) - \log\left(\sqrt{a}\sqrt{z} + 1\right)\right)$$

01.28.21.0008.01

$$\int z\coth^{-1}(b + a z)\,dz = \frac{1}{4}\left(\frac{\log(b + a z - 1)(b-1)^2}{a^2} + \frac{2z}{a} + 2z^2\coth^{-1}(b + a z) - \frac{(b+1)^2\log(b + a z + 1)}{a^2}\right)$$

01.28.21.0009.01

$$\int z\coth^{-1}(a z)\,dz = \frac{2a^2\coth^{-1}(a z)z^2 + 2 a z + \log(a z - 1) - \log(a z + 1)}{4a^2}$$

01.28.21.0010.01

$$\int \frac{\coth^{-1}(b + a z)}{z}\,dz = \left(\coth^{-1}(b + a z) - \tanh^{-1}(b + a z)\right)\log(z) -$$
$$\frac{1}{2} i \Bigg(i\left(\tanh^{-1}(b) - \tanh^{-1}(b + a z)\right)^2 - 2 i \log\left(1 - e^{2\tanh^{-1}(b) - 2\tanh^{-1}(b + a z)}\right)\left(\tanh^{-1}(b) - \tanh^{-1}(b + a z)\right) +$$
$$2 i \log\left(-2 i \sinh\left(\tanh^{-1}(b) - \tanh^{-1}(b + a z)\right)\right)\left(\tanh^{-1}(b) - \tanh^{-1}(b + a z)\right) - \frac{1}{4} i \left(\pi - 2 i \tanh^{-1}(b + a z)\right)^2 +$$
$$\left(\pi - 2 i \tanh^{-1}(b + a z)\right)\log\left(1 + e^{2\tanh^{-1}(b + a z)}\right) - \left(\pi - 2 i \tanh^{-1}(b + a z)\right)\log\left(\frac{2}{\sqrt{1 - (b + a z)^2}}\right) +$$
$$2 i \tanh^{-1}(b + a z)\left(\log\left(-i \sinh\left(\tanh^{-1}(b) - \tanh^{-1}(b + a z)\right)\right) - \log\left(\frac{1}{\sqrt{1 - (b + a z)^2}}\right)\right) -$$
$$i\,\mathrm{Li}_2\left(-e^{2\tanh^{-1}(b + a z)}\right) - i\,\mathrm{Li}_2\left(e^{2\tanh^{-1}(b) - 2\tanh^{-1}(b + a z)}\right)\Bigg)$$

01.28.21.0011.01

$$\int \frac{\coth^{-1}(a z)}{z}\,dz = \frac{1}{2}\left(\mathrm{Li}_2\left(-\frac{1}{a z}\right) - \mathrm{Li}_2\left(\frac{1}{a z}\right)\right)$$

01.28.21.0012.01

$$\int \frac{\coth^{-1}(a z)}{z^2}\,dz = -\frac{\coth^{-1}(a z)}{z} + a\log(z) - \frac{1}{2} a \log\left(a^2 z^2 - 1\right)$$

Power arguments

01.28.21.0013.01

$$\int \coth^{-1}(a z^r)\,dz = \frac{z}{r+1}\left((r+1)\coth^{-1}(a z^r) - a r z^r\,{}_2F_1\left(\frac{r+1}{2r}, 1; \frac{1}{2}\left(3 + \frac{1}{r}\right); a^2 z^{2r}\right)\right)$$

01.28.21.0014.01

$$\int z^{\alpha-1} \coth^{-1}(a z^r)\, dz = \frac{z^\alpha}{\alpha (r+\alpha)} \left((r+\alpha) \coth^{-1}(a z^r) - a r z^r\, {}_2F_1\left(\frac{r+\alpha}{2 r}, 1; \frac{3 r+\alpha}{2 r}; a^2 z^{2 r} \right) \right)$$

01.28.21.0018.01

$$\int \frac{\coth^{-1}(a z^r)}{z}\, dz = \frac{a \Phi\left(a^2 z^{2 r}, 2, \frac{1}{2}\right) z^r}{4 r} + \left(\coth^{-1}(a z^r) - \tanh^{-1}(a z^r)\right) \log(z)$$

Other

01.28.21.0015.01

$$\int \coth^{-1}\left(a z^2 + b z + c\right) dz = z \coth^{-1}\left(a z^2 + b z + c\right) + \frac{\sqrt{4 a c - b^2 + 4 a}}{2 a} \tan^{-1}\left(\frac{b + 2 a z}{\sqrt{4 a c - b^2 + 4 a}} \right) + \frac{\left(b^2 + 4 a - 4 a c\right)}{2 a \sqrt{4 a c - b^2 - 4 a}} \tan^{-1}\left(\frac{b + 2 a z}{\sqrt{4 a c - b^2 - 4 a}} \right) + \frac{b \log\left(a z^2 + b z + c + 1\right)}{4 a} - \frac{b \log\left(a z^2 + b z + c - 1\right)}{4 a}$$

01.28.21.0016.01

$$\int e^{a z} \coth^{-1}(b z)\, dz = \frac{e^{a z}}{a} \coth^{-1}(b z) + \frac{e^{a/b}}{2 a} \operatorname{Ei}\left(a z - \frac{a}{b}\right) - \frac{1}{2 a e^{a/b}} \operatorname{Ei}\left(z a + \frac{a}{b}\right)$$

Definite integration

For the direct function itself

01.28.21.0017.01

$$\int_1^\infty \frac{\coth^{-1}(x)}{x}\, dx = \frac{\pi^2}{8}$$

Integral transforms

Inverse Laplace transforms

01.28.22.0001.01

$$\mathcal{L}_t^{-1}\left[\coth^{-1}(t)\right](z) = \frac{\sinh(z)}{z}$$

Representations through more general functions

Through hypergeometric functions

Involving ${}_2F_1$

01.28.26.0001.01

$$\coth^{-1}(z) = \frac{1}{z}\, {}_2F_1\left(1, \frac{1}{2}; \frac{3}{2}; \frac{1}{z^2}\right)$$

01.28.26.0002.01

$$\coth^{-1}(z) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z + z\, {}_2F_1\left(\frac{1}{2}, 1; \frac{3}{2}; z^2\right) /; z \notin (-\infty, -1) \land z \notin (1, \infty)$$

01.28.26.0003.01

$$\coth^{-1}(z) = \frac{\log(2)}{2} - \frac{1}{2}\log(z-1) + \frac{z-1}{4}\, {}_2F_1\left(1, 1; 2; \frac{1-z}{2}\right) /; z \notin (-1, 0)$$

01.28.26.0004.01

$$\coth^{-1}(z) = -\frac{\log(2)}{2} + \frac{1}{2}\log(-z-1) + \frac{1}{4}(z+1)\, {}_2F_1\left(1, 1; 2; \frac{z+1}{2}\right) /; z \notin (0, 1)$$

Through Meijer G

Classical cases for the direct function itself

01.28.26.0005.01

$$\coth^{-1}(z) = \frac{1}{2z} G_{2,2}^{1,2}\left(-\frac{1}{z^2} \,\middle|\, \begin{matrix} 0, \frac{1}{2} \\ 0, -\frac{1}{2} \end{matrix}\right)$$

01.28.26.0006.01

$$\coth^{-1}(z) = -\frac{1}{2}\sqrt{-\frac{1}{z^2}}\, z\, G_{2,2}^{1,2}\left(-\frac{1}{z^2} \,\middle|\, \begin{matrix} \frac{1}{2}, 1 \\ \frac{1}{2}, 0 \end{matrix}\right)$$

01.28.26.0007.01

$$\coth^{-1}(z) = -\frac{i}{2} G_{2,2}^{1,2}\left(-\frac{1}{z^2} \,\middle|\, \begin{matrix} \frac{1}{2}, 1 \\ \frac{1}{2}, 0 \end{matrix}\right) /; 0 \leq \arg(z) < \pi$$

01.28.26.0008.01

$$\coth^{-1}(z) = \frac{\sqrt{-z^2}}{2z} G_{2,2}^{2,1}\left(-z^2 \,\middle|\, \begin{matrix} \frac{1}{2}, 1 \\ 0, \frac{1}{2} \end{matrix}\right)$$

01.28.26.0018.01

$$\coth^{-1}(z) + \frac{1}{4}\pi\left(\sqrt{-\frac{1}{z^2}}\, z + i\left(\sqrt{\frac{1}{1-z}}\sqrt{1-z} - \sqrt{1-\frac{1}{z}}\sqrt{\frac{z}{z-1}} + \frac{i\sqrt{-z^2}}{z} + \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}} - \sqrt{\frac{1}{z+1}}\sqrt{z+1}\right)\right) - \sum_{k=0}^{n}\frac{z^{2k+1}}{2k+1} = \frac{(-1)^n\sqrt{-z^2}}{2z} G_{3,3}^{1,3}\left(-z^2 \,\middle|\, \begin{matrix} 1, n+\frac{3}{2}, \frac{1}{2} \\ n+\frac{3}{2}, 0, \frac{1}{2} \end{matrix}\right) /; n \in \mathbb{N}$$

01.28.26.0019.01

$$\coth^{-1}(z) - \sum_{k=0}^{n}\frac{z^{-2k-1}}{2k+1} = \frac{(-1)^n z}{2}\sqrt{-\frac{1}{z^2}}\, G_{3,3}^{1,3}\left(-\frac{1}{z^2} \,\middle|\, \begin{matrix} 1, n+\frac{3}{2}, \frac{1}{2} \\ n+\frac{3}{2}, 0, \frac{1}{2} \end{matrix}\right) /; n \in \mathbb{N}$$

01.28.26.0009.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\sqrt{-z^2}\; G_{2,2}^{2,1}\left(-z \left| \begin{matrix} -\frac{1}{2}, 0 \\ -1, -\frac{1}{2} \end{matrix} \right.\right)$$

01.28.26.0020.01

$$\coth^{-1}\left(\sqrt{z}\right) - \sum_{k=0}^{n} \frac{z^{k+\frac{1}{2}}}{2k+1} - \frac{\pi\sqrt{-z}}{2\sqrt{z}} = \frac{(-1)^n \sqrt{-z}}{2\sqrt{z}}\, G_{3,3}^{1,3}\left(-z \left| \begin{matrix} 1, n+\frac{3}{2}, \frac{1}{2} \\ n+\frac{3}{2}, 0, \frac{1}{2} \end{matrix} \right.\right) /; n \in \mathbb{N} \bigwedge z \notin (0, 1)$$

01.28.26.0021.01

$$\coth^{-1}\left(\sqrt{z}\right) - \sum_{k=0}^{n} \frac{z^{-k-\frac{1}{2}}}{2k+1} = \frac{(-1)^n \sqrt{z}}{2} \sqrt{-\frac{1}{z}}\, G_{3,3}^{1,3}\left(-\frac{1}{z} \left| \begin{matrix} 1, n+\frac{3}{2}, \frac{1}{2} \\ n+\frac{3}{2}, 0, \frac{1}{2} \end{matrix} \right.\right) /; n \in \mathbb{N}$$

Generalized cases for the direct function itself

01.28.26.0010.01

$$\coth^{-1}(z) = -\frac{z}{2} G_{2,2}^{1,2}\left(\sqrt{-\frac{1}{z^2}}, \frac{1}{2} \left| \begin{matrix} 1, \frac{3}{2} \\ 1, \frac{1}{2} \end{matrix} \right.\right)$$

01.28.26.0011.01

$$\coth^{-1}(z) = -\frac{i}{2} G_{2,2}^{2,1}\left(-i z, \frac{1}{2} \left| \begin{matrix} \frac{1}{2}, 1 \\ \frac{1}{2}, 0 \end{matrix} \right.\right)$$

01.28.26.0022.01

$$\coth^{-1}(z) + \frac{1}{4}\pi\left(\sqrt{-\frac{1}{z^2}}\, z + i\left(\sqrt{\frac{1}{1-z}}\sqrt{1-z} - \sqrt{1-\frac{1}{z}}\sqrt{\frac{z}{z-1}} + \frac{i\sqrt{-z^2}}{z} + \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}} - \sqrt{\frac{1}{z+1}}\sqrt{z+1}\right)\right) - \sum_{k=0}^{n} \frac{z^{2k+1}}{2k+1} = \frac{(-1)^{n-1} i}{2} G_{3,3}^{1,3}\left(-i z, \frac{1}{2} \left| \begin{matrix} 1, n+\frac{3}{2}, \frac{1}{2} \\ n+\frac{3}{2}, 0, \frac{1}{2} \end{matrix} \right.\right) /; n \in \mathbb{N}$$

01.28.26.0023.01

$$\coth^{-1}(z) - \sum_{k=0}^{n} \frac{z^{2k+1}}{2k+1} - \frac{\pi\sqrt{-z}}{2\sqrt{z}} = \frac{(-1)^n i}{2} G_{3,3}^{1,3}\left(i z, \frac{1}{2} \left| \begin{matrix} 1, n+\frac{3}{2}, \frac{1}{2} \\ n+\frac{3}{2}, 0, \frac{1}{2} \end{matrix} \right.\right) /; n \in \mathbb{N} \bigwedge z \notin (-1, 1)$$

01.28.26.0024.01

$$\coth^{-1}(z) - \sum_{k=0}^{n} \frac{z^{-2k-1}}{2k+1} = \frac{(-1)^{n-1} i}{2} G_{3,3}^{1,3}\left(-\frac{i}{z}, \frac{1}{2} \left| \begin{matrix} 1, n+\frac{3}{2}, \frac{1}{2} \\ n+\frac{3}{2}, 0, \frac{1}{2} \end{matrix} \right.\right) /; n \in \mathbb{N}$$

Through other functions

Involving inverse Jacobi functions

01.28.26.0012.01

$$\coth^{-1}(z) = i \operatorname{cs}^{-1}(i z \mid 0)$$

01.28.26.0013.01

$$\coth^{-1}(z) = \operatorname{ns}^{-1}(z \mid 1)$$

01.28.26.0014.01

$$\coth^{-1}(z) = -i\, \mathrm{sc}^{-1}\left(\frac{i}{z} \,\middle|\, 0\right)$$

01.28.26.0015.01

$$\coth^{-1}(z) = \mathrm{sn}^{-1}\left(\frac{1}{z} \,\middle|\, 1\right)$$

Involving some elliptic-type functions

01.28.26.0016.01

$$\coth^{-1}(z) = \sqrt{z-1}\; \Pi\left(z; \tan^{-1}\left(\frac{1}{\sqrt{z-1}\; z}\right) \,\middle|\, 0\right)$$

Involving some hypergeometric-type functions

01.28.26.0017.01

$$\coth^{-1}(z) = \frac{z}{2} \sqrt{\frac{1}{z^2}}\; B_{\frac{1}{z^2}}\left(\frac{1}{2}, 0\right)$$

Representations through equivalent functions

With inverse function

Involving $\coth^{-1}(\coth(z))$

01.28.27.0001.01

$$\coth^{-1}(\coth(z)) = z \;/;\; -\frac{\pi}{2} < \mathrm{Im}(z) < \frac{\pi}{2} \bigvee \left(\mathrm{Im}(z) = -\frac{\pi}{2} \bigwedge \mathrm{Re}(z) > 0\right) \bigvee \left(\mathrm{Im}(z) = \frac{\pi}{2} \bigwedge \mathrm{Re}(z) \leq 0\right)$$

01.28.27.0002.01

$$\coth^{-1}(\coth(z)) = z + \pi i \;/;\; -\frac{3\pi}{2} < \mathrm{Im}(z) < -\frac{\pi}{2} \bigvee \left(\mathrm{Im}(z) = -\frac{3\pi}{2} \bigwedge \mathrm{Re}(z) > 0\right) \bigvee \left(\mathrm{Im}(z) = -\frac{\pi}{2} \bigwedge \mathrm{Re}(z) \leq 0\right)$$

01.28.27.0003.01

$$\coth^{-1}(\coth(z)) = z - \pi i \;/;\; \frac{\pi}{2} < \mathrm{Im}(z) < \frac{3\pi}{2} \bigvee \left(\mathrm{Im}(z) = \frac{\pi}{2} \bigwedge \mathrm{Re}(z) > 0\right) \bigvee \left(\mathrm{Im}(z) = \frac{3\pi}{2} \bigwedge \mathrm{Re}(z) \leq 0\right)$$

01.28.27.0004.01

$$\coth^{-1}(\coth(z)) = z - \pi i k \;/;$$
$$\left(k\pi - \frac{\pi}{2} < \mathrm{Im}(z) < \pi k + \frac{\pi}{2} \bigvee \left(\mathrm{Im}(z) = k\pi - \frac{\pi}{2} \bigwedge \mathrm{Re}(z) > 0\right) \bigvee \left(\mathrm{Im}(z) = \pi k + \frac{\pi}{2} \bigwedge \mathrm{Re}(z) \leq 0\right)\right) \bigwedge k \in \mathbb{Z}$$

01.28.27.0005.01

$$\coth^{-1}(\coth(z)) = z - i\pi \left\lfloor \frac{\mathrm{Im}(z)}{\pi} + \frac{1}{2} \right\rfloor + \frac{\pi i}{2} \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Im}(z)}{\pi} - \frac{1}{2} \right\rfloor + \left\lfloor \frac{1}{2} - \frac{\mathrm{Im}(z)}{\pi} \right\rfloor}\right) \theta(-\mathrm{Re}(z)) \;/;\; \frac{i z}{\pi} - \frac{1}{2} \notin \mathbb{Z}$$

01.28.27.3545.01

$$\coth^{-1}(\coth(z)) = \begin{cases} z - \pi i \left\lfloor \frac{2\,\mathrm{Im}(z) - \pi}{2\pi} \right\rfloor & \frac{2\,\mathrm{Im}(z)+\pi}{2\pi} \in \mathbb{Z} \bigwedge \mathrm{Re}(z) \leq 0 \\ z - \pi i \left\lfloor \frac{2\,\mathrm{Im}(z)+\pi}{2\pi} \right\rfloor & \mathrm{True} \end{cases}$$

01.28.27.3546.01

$$\coth^{-1}(\coth(z)) = \tanh^{-1}(\tanh(z)) \;/;\; \frac{\pi - 2 i z}{2 \pi} \notin \mathbb{Z}$$

Involving $\coth(n \coth^{-1}(z))$

01.28.27.0006.01

$$\coth(\coth^{-1}(z)) = z$$

01.28.27.0007.01

$$\coth(n \coth^{-1}(z)) = \frac{(z-1)^n + (z+1)^n}{(z+1)^n - (z-1)^n} \;/;\; n \in \mathbb{N}^+$$

Involving $\coth^{-1}(\tanh(z))$

01.28.27.3547.01

$$\coth^{-1}(\tanh(z)) = z - \frac{i \pi}{2} \;/;\; 0 < \mathrm{Im}(z) < \pi \lor (\mathrm{Im}(z) = 0 \land \mathrm{Re}(z) > 0) \lor (\mathrm{Im}(z) = \pi \land \mathrm{Re}(z) \leq 0)$$

01.28.27.3548.01

$$\coth^{-1}(\tanh(z)) = z + \frac{i \pi}{2} \;/;\; -\pi < \mathrm{Im}(z) < 0 \lor (\mathrm{Im}(z) = -\pi \land \mathrm{Re}(z) > 0) \lor (\mathrm{Im}(z) = 0 \land \mathrm{Re}(z) \leq 0)$$

01.28.27.3549.01

$$\coth^{-1}(\tanh(z)) = z - \frac{i \pi}{2} - k \pi i \;/;$$
$$(k \pi < \mathrm{Im}(z) < (k+1) \pi \bigvee (\mathrm{Im}(z) = k \pi \bigwedge \mathrm{Re}(z) > 0) \bigvee (\mathrm{Im}(z) = (k+1) \pi \bigwedge \mathrm{Re}(z) \leq 0)) \bigwedge k \in \mathbb{Z}$$

01.28.27.3550.01

$$\coth^{-1}(\tanh(z)) = z - \frac{i \pi}{2} - i \pi \left\lfloor \frac{\mathrm{Im}(z)}{\pi} \right\rfloor + \frac{\pi i}{2} \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Im}(z)}{\pi} \right\rfloor - \left\lceil \frac{\mathrm{Im}(z)}{\pi} \right\rceil}\right) \theta(-\mathrm{Re}(z)) \;/;\; \frac{i z}{\pi} \notin \mathbb{Z}$$

01.28.27.3551.01

$$\coth^{-1}(\tanh(z)) = \begin{cases} z - \pi i \left\lfloor \frac{\mathrm{Im}(z)}{\pi} \right\rfloor + \frac{i \pi}{2} & \frac{\mathrm{Im}(z)}{\pi} \in \mathbb{Z} \bigwedge \mathrm{Re}(z) \leq 0 \\ z - \pi i \left\lfloor \frac{\mathrm{Im}(z)}{\pi} \right\rfloor - \frac{i \pi}{2} & \text{True} \end{cases}$$

01.28.27.3552.01

$$\coth^{-1}(\tanh(z)) = \tanh^{-1}(\coth(z)) \;/;\; \frac{i z}{\pi} \notin \mathbb{Z}$$

With related functions

Involving log

01.28.27.0008.01

$$\coth^{-1}(z) = \frac{1}{2} \log\left(\frac{z+1}{z-1}\right) \;/;\; z \notin (0, 1)$$

01.28.27.0009.01

$$\coth^{-1}(z) = \log\left(\sqrt{\frac{z+1}{z-1}}\right) \;/;\; z \notin (0, 1)$$

01.28.27.3553.01

$$\coth^{-1}(z) = \frac{1}{2} \left(\log\left(\frac{z+1}{z}\right) - \log\left(\frac{z-1}{z}\right)\right)$$

01.28.27.3554.01

$$\coth^{-1}(z) = \frac{1}{2}(\log(-z-1) - \log(z-1) - \log(-z) + \log(z))$$

Involving $\sin^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right)$

01.28.27.0038.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} - \frac{1}{2} i \sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0039.01

$$\coth^{-1}(z) = \frac{\pi i}{4} + \frac{1}{2} i \sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0040.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} + \frac{1}{2} i \sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0041.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} - \frac{1}{2} i \sin^{-1}\left(\frac{1+z^2}{1-z^2}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0042.01

$$\coth^{-1}(z) = \frac{\pi i}{4}\left(i\sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\right) + \frac{\sqrt{-z^2}\sqrt{1-z^2}}{2z}\sqrt{\frac{1}{1-z^2}}\sin^{-1}\left(\frac{1+z^2}{1-z^2}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right)$

01.28.27.0043.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} + \frac{1}{2} i \sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0044.01

$$\coth^{-1}(z) = \frac{\pi i}{4} - \frac{1}{2} i \sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0045.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} - \frac{1}{2} i \sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0046.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} + \frac{1}{2} i \sin^{-1}\left(\frac{z^2+1}{z^2-1}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0047.01

$$\coth^{-1}(z) = \frac{\pi i}{4}\left(i\sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\right) - \frac{\sqrt{-z^2}\sqrt{1-z^2}}{2z}\sqrt{\frac{1}{1-z^2}}\sin^{-1}\left(\frac{z^2+1}{z^2-1}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

01.28.27.0048.01

$$\coth^{-1}(z) = -i\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0049.01

$$\coth^{-1}(z) = i\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0050.01

$$\coth^{-1}(z) = \pi i - i\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0051.01

$$\coth^{-1}(z) = -\pi i + i\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0052.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}\right) + \frac{\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

01.28.27.0053.01

$$\coth^{-1}(z) = -i\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0054.01

$$\coth^{-1}(z) = i\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0055.01

$$\coth^{-1}(z) = \pi i - i\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0056.01

$$\coth^{-1}(z) = -\pi i + i \sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0057.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}\right) + \frac{\sqrt{-z^2}}{z}\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}}\sin^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

01.28.27.0058.01

$$\coth^{-1}(z) = -i \sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0059.01

$$\coth^{-1}(z) = i \sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) - \frac{\pi i}{2} /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0060.01

$$\coth^{-1}(z) = -i \sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0061.01

$$\coth^{-1}(z) = i \sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0062.01

$$\coth^{-1}(z) = \sqrt{z^2}\sqrt{-\frac{1}{z^2}} \sin^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) - \frac{1}{2}\pi\sqrt{-\frac{1}{z^2}}\, z$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

01.28.27.0063.01

$$\coth^{-1}(z) = i \sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) - \frac{\pi i}{2} /; 0 \leq \arg(z) < \pi$$

01.28.27.0064.01

$$\coth^{-1}(z) = -i \sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0065.01

$$\coth^{-1}(z) = \sqrt{-\frac{1}{z^2}}\, z \sin^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) - \frac{1}{2}\pi\sqrt{-\frac{1}{z^2}}\, z$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

01.28.27.0066.01

$$\coth^{-1}(z) = i \sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0067.01

$$\coth^{-1}(z) = -i \sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0068.01

$$\coth^{-1}(z) = -i \sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0069.01

$$\coth^{-1}(z) = i \sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0070.01

$$\coth^{-1}(z) = \sqrt{\frac{z^2-1}{z^2}}\sqrt{\frac{z^2}{z^2-1}}\sqrt{-\frac{1}{z^2}}\, z \sin^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) - \frac{1}{2}\pi\sqrt{-\frac{1}{z^2}}\, z$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

01.28.27.0071.01

$$\coth^{-1}(z) = i \sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0072.01

$$\coth^{-1}(z) = -i \sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0073.01

$$\coth^{-1}(z) = -i \sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0074.01

$$\coth^{-1}(z) = i \sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0075.01

$$\coth^{-1}(z) = \sqrt{\frac{z^2-1}{z^2}} \sqrt{\frac{z^2}{z^2-1}} \sqrt{-\frac{1}{z^2}}\, z \sin^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) - \frac{1}{2} \pi \sqrt{-\frac{1}{z^2}}\, z$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z^2}+1} \Big/ \left(\sqrt{2}\,(1-z^2)^{1/4}\right)\right)$

01.28.27.0076.01

$$\coth^{-1}(z) = -2 i \sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0077.01

$$\coth^{-1}(z) = 2 i \sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0078.01

$$\coth^{-1}(z) = -2 i \sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{3 \pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0079.01

$$\coth^{-1}(z) = 2 i \sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) - \frac{3 \pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0080.01

$$\coth^{-1}(z) = \frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z^2}-1} \Big/ \left(\sqrt{2}\,(1-z^2)^{1/4}\right)\right)$

01.28.27.0081.01

$$\coth^{-1}(z) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) - \frac{\pi i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0082.01

$$\coth^{-1}(z) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0083.01

$$\coth^{-1}(z) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0084.01

$$\coth^{-1}(z) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0085.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} - \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z^2}+1\right) \Big/ \left(2\sqrt{1-z^2}\right)}\right)$

01.28.27.0086.01

$$\coth^{-1}(z) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right)+\frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z)>0\lor(z\in\mathbb{R}\land z<-1)$$

01.28.27.0087.01

$$\coth^{-1}(z) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right)-\frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z)<0\lor(z\in\mathbb{R}\land z>1)$$

01.28.27.0088.01

$$\coth^{-1}(z) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right)+\frac{3\pi\,i}{2}\;/;\;(z\in\mathbb{R}\land -1<z<0)$$

01.28.27.0089.01

$$\coth^{-1}(z) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right)-\frac{3\pi\,i}{2}\;/;\;(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.0090.01

$$\coth^{-1}(z) = \frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right)+\frac{\pi\,i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}-\sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}+\frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z^2}-1\right)\Big/\left(2\sqrt{1-z^2}\right)}\right)$

01.28.27.0091.01

$$\coth^{-1}(z) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right)-\frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z)>0\lor(z\in\mathbb{R}\land z<-1)$$

01.28.27.0092.01

$$\coth^{-1}(z) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right)+\frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z)<0\lor(z\in\mathbb{R}\land z>1)$$

01.28.27.0093.01

$$\coth^{-1}(z) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right)-\frac{\pi\,i}{2}\;/;\;(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.0094.01

$$\coth^{-1}(z) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right)+\frac{\pi i}{2}\;/;\;(z\in\mathbb{R}\land -1<z<0)$$

01.28.27.0095.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right)+\frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}-\sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}-\frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\sqrt{z^2-1}+z}\Big/\left(\sqrt{2}\left(z^2-1\right)^{1/4}\right)\right)$

01.28.27.0096.01

$$\coth^{-1}(z) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\left(z^2-1\right)^{1/4}}\right)-\pi i\;/;\;0\leq\arg(z)\leq\frac{\pi}{2}$$

01.28.27.0097.01

$$\coth^{-1}(z) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\left(z^2-1\right)^{1/4}}\right)+\pi i\;/;\;-\frac{\pi}{2}<\arg(z)<0$$

01.28.27.0098.01

$$\coth^{-1}(z) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\left(z^2-1\right)^{1/4}}\right)\;/;\;\frac{\pi}{2}<\arg(z)<\pi$$

01.28.27.0099.01

$$\coth^{-1}(z) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\left(z^2-1\right)^{1/4}}\right)\;/;\;-\pi<\arg(z)\leq-\frac{\pi}{2}\bigvee(z\in\mathbb{R}\land z<0)$$

01.28.27.0100.01

$$\coth^{-1}(z) = 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\left(z^2-1\right)^{1/4}}\right)-\frac{\pi\left(z+\sqrt{z^2}\right)}{2\sqrt{z}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\sqrt{z^2-1}-z} \Big/ \left(\sqrt{2}\,(z^2-1)^{1/4}\right)\right)$

01.28.27.0101.01

$$\coth^{-1}(z) = -2\,i\,\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /;\ 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0102.01

$$\coth^{-1}(z) = 2\,i\,\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0103.01

$$\coth^{-1}(z) = -\pi\,i + 2\,i\,\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /;\ \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0104.01

$$\coth^{-1}(z) = \pi\,i - 2\,i\,\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0105.01

$$\coth^{-1}(z) = \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1-\frac{\sqrt{z^2}}{z}\right) - 2\sqrt{z^2}\,\sqrt{-\frac{1}{z^2}}\,\sin^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right)$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2-1}+z\right) \Big/ \left(2\sqrt{z^2-1}\right)}\right)$

01.28.27.0106.01

$$\coth^{-1}(z) = 2\,i\,\sin^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) - \pi\,i /;\ 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0107.01

$$\coth^{-1}(z) = -2\, i \sin^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) + \pi\, i \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0108.01

$$\coth^{-1}(z) = -2\, i \sin^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0109.01

$$\coth^{-1}(z) = 2\, i \sin^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0110.01

$$\coth^{-1}(z) = 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\, \sin^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) - \frac{\pi\left(z+\sqrt{z^2}\right)}{2\sqrt{z}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(z)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{z^2-1}-z\right)\Big/\left(2\sqrt{z^2-1}\right)}\right)$

01.28.27.0111.01

$$\coth^{-1}(z) = -2\, i \sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /;\; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0112.01

$$\coth^{-1}(z) = 2\, i \sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0113.01

$$\coth^{-1}(z) = -\pi\, i + 2\, i \sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0114.01

$$\coth^{-1}(z) = \pi\, i - 2\, i \sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0115.01

$$\coth^{-1}(z) = \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1-\frac{\sqrt{z^2}}{z}\right)-2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\sin^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$

Involving $\coth^{-1}(\sqrt{z})$ and $\sin^{-1}\left(\frac{1+z}{1-z}\right)$

01.28.27.0116.01

$$\coth^{-1}(\sqrt{z}) = -\frac{i}{2}\sin^{-1}\left(\frac{1+z}{1-z}\right)-\frac{\pi i}{4} /; 0<\arg(z)\leq\pi \bigvee (z\in\mathbb{R}\wedge z>1)$$

01.28.27.0117.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2} i\sin^{-1}\left(\frac{1+z}{1-z}\right)+\frac{\pi i}{4} /; \operatorname{Im}(z)<0$$

01.28.27.0118.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2} i\sin^{-1}\left(\frac{1+z}{1-z}\right)-\frac{3\pi i}{4} /; (z\in\mathbb{R}\wedge 0<z<1)$$

01.28.27.0119.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi i}{4}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}+i\sqrt{z}\sqrt{-\frac{1}{z}}-1\right)+\frac{\sqrt{1-z}\sqrt{-z^2}}{2z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\frac{1+z}{1-z}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sin^{-1}\left(\frac{z+1}{z-1}\right)$

01.28.27.0120.01

$$\coth^{-1}(\sqrt{z}) = \frac{i}{2}\sin^{-1}\left(\frac{z+1}{z-1}\right)-\frac{\pi i}{4} /; 0<\arg(z)\leq\pi \bigvee (z\in\mathbb{R}\wedge z>1)$$

01.28.27.0121.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2} i\sin^{-1}\left(\frac{z+1}{z-1}\right)+\frac{\pi i}{4} /; \operatorname{Im}(z)<0$$

01.28.27.0122.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2} i\sin^{-1}\left(\frac{z+1}{z-1}\right)-\frac{3\pi i}{4} /; (z\in\mathbb{R}\wedge 0<z<1)$$

01.28.27.0123.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi i}{4}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}+i\sqrt{z}\sqrt{-\frac{1}{z}}-1\right)-\frac{\sqrt{1-z}\sqrt{-z^2}}{2z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\frac{z+1}{z-1}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$

01.28.27.0124.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\, i \sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi\, i}{2} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0125.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2} \sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) + \frac{\pi\, i}{2} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.0126.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2} \sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi\, i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0127.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{-z^2}}{2\, z} \sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi\sqrt{z}}{2} \sqrt{-\frac{1}{z}} \;/;\; |z| < 1$$

01.28.27.0128.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2} \sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0129.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0130.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2\, z} \sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /;\; |z| > 1$$

01.28.27.0131.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi\sqrt{z}}{4} \sqrt{-\frac{1}{z}} \left(\frac{1+z}{1-z} \sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) - \frac{\sqrt{-z^2}\; (z+1)}{2\, z\, (1-z)} \sqrt{\left(\frac{1-z}{1+z}\right)^2} \sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$

01.28.27.0132.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\, i \sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi\, i}{2} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0133.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{\pi\, i}{2} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.0134.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi\, i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0135.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z} \sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi\sqrt{z}}{2} \sqrt{-\frac{1}{z}} \;/;\; |z| < 1$$

01.28.27.0136.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0137.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2} \sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0138.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{-z^2}}{2z} \sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /;\; |z| > 1$$

01.28.27.0139.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi\sqrt{z}}{4} \sqrt{-\frac{1}{z}} \left(\frac{1+z}{1-z} \sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) + \frac{\sqrt{-z^2}\,(z+1)}{2z(1-z)} \sqrt{\left(\frac{1-z}{1+z}\right)^2} \sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

01.28.27.0140.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i \sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) /;\; 0 < \arg(z) \leq \pi$$

01.28.27.0141.01

$$\coth^{-1}\left(\sqrt{z}\right) = i \sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) /;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0142.01

$$\coth^{-1}\left(\sqrt{z}\right) = i \sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0143.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{z} \sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) - \frac{\pi i}{2}\left(1 - \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

01.28.27.0144.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i \sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) /;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0145.01

$$\coth^{-1}(\sqrt{z}) = i \sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0146.01

$$\coth^{-1}(\sqrt{z}) = i \sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0147.01

$$\coth^{-1}(\sqrt{z}) = \frac{\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}} \sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \frac{\pi i}{2}\left(1 - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

01.28.27.0148.01

$$\coth^{-1}(\sqrt{z}) = i \sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) \geq 0$$

01.28.27.0149.01

$$\coth^{-1}(\sqrt{z}) = -i \sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.0150.01

$$\coth^{-1}(\sqrt{z}) = \sqrt{z}\sqrt{-\frac{1}{z}} \sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

01.28.27.0151.01

$$\coth^{-1}(\sqrt{z}) = i \sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0152.01

$$\coth^{-1}(\sqrt{z}) = -i \sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.0153.01

$$\coth^{-1}(\sqrt{z}) = -i \sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0154.01

$$\coth^{-1}(\sqrt{z}) = \sqrt{z-1}\sqrt{-\frac{1}{z}}\sqrt{\frac{z}{z-1}} \sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

01.28.27.0155.01

$$\coth^{-1}\left(\sqrt{z}\right) = i\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0156.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) + \frac{\pi i}{2} \;/;\; \mathrm{Im}(z) < 0$$

01.28.27.0157.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0158.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{1-z}\sqrt{-z^2}}{z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z}+1}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0159.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0160.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi i}{2} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0161.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0162.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \pi\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} + \frac{\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z}-1}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0163.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0164.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0165.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0166.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z}+1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0167.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.0168.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0169.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{3\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0170.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \pi\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} + \frac{\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z}-1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0171.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.0172.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0173.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0174.01

$$\coth^{-1}(\sqrt{z}) = -\frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z}+\sqrt{-z}} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0175.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \pi\,i \;/;\; 0 < \arg(z) \le \pi \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0176.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \pi\,i \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.0177.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0178.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi\,i}{2}\left(1 + 2\,i\sqrt{z}\sqrt{-\frac{1}{z}} - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right) - \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z}-\sqrt{-z}} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0179.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.0180.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0181.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \pi\,i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0182.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - 1\right) + \frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z} - \sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z} + \sqrt{-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0183.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2 i \sin^{-1}\left(\sqrt{\frac{\sqrt{1-z} + \sqrt{-z}}{2\sqrt{1-z}}}\right) - \pi i \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0184.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2 i \sin^{-1}\left(\sqrt{\frac{\sqrt{1-z} + \sqrt{-z}}{2\sqrt{1-z}}}\right) + \pi i \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.0185.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2 i \sin^{-1}\left(\sqrt{\frac{\sqrt{1-z} + \sqrt{-z}}{2\sqrt{1-z}}}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0186.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(1 + 2 i \sqrt{z}\sqrt{-\frac{1}{z}} - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right) - \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z} + \sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z} - \sqrt{-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0187.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2 i \sin^{-1}\left(\sqrt{\frac{\sqrt{1-z} - \sqrt{-z}}{2\sqrt{1-z}}}\right) \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0188.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2 i \sin^{-1}\left(\sqrt{\frac{\sqrt{1-z} - \sqrt{-z}}{2\sqrt{1-z}}}\right) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.0189.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2 i \sin^{-1}\left(\sqrt{\frac{\sqrt{1-z} - \sqrt{-z}}{2\sqrt{1-z}}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0190.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - 1\right) + \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z} - \sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\frac{1+z}{1-z}\right)$

01.28.27.0191.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sin^{-1}\left(\frac{z+1}{1-z}\right) + \frac{\pi i}{4} /; 0 < \arg(z) \leq \pi$$

01.28.27.0192.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sin^{-1}\left(\frac{1+z}{1-z}\right) - \frac{\pi i}{4} /; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0193.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sin^{-1}\left(\frac{1+z}{1-z}\right) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0194.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right) + \frac{\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\frac{1+z}{1-z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\frac{z+1}{z-1}\right)$

01.28.27.0195.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sin^{-1}\left(\frac{z+1}{z-1}\right) + \frac{\pi i}{4} /; 0 < \arg(z) \leq \pi$$

01.28.27.0196.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sin^{-1}\left(\frac{z+1}{z-1}\right) - \frac{\pi i}{4} /; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0197.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sin^{-1}\left(\frac{z+1}{z-1}\right) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0198.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right) - \frac{\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\frac{z+1}{z-1}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$

01.28.27.0199.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0200.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /; |z| < 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0201.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\sqrt{-z^2}}{2z}\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /; |z| < 1$$

01.28.27.0202.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) + \frac{\pi i}{2} /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0203.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi i}{2} /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0204.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi\sqrt{-z^2}}{2z} /; |z| > 1$$

01.28.27.0205.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi\sqrt{-z^2}}{4z}\left(1 - \frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right) - \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\sin^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$

01.28.27.0206.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0207.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /; |z| < 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0208.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /; |z| < 1$$

01.28.27.0209.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{\pi i}{2} /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0210.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi i}{2} /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0211.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\sqrt{-z^2}}{2z}\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi\sqrt{-z^2}}{2z} /; |z| > 1$$

01.28.27.0212.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi\sqrt{-z^2}}{4z}\left(1 - \frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right) + \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\sin^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

01.28.27.0213.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) + \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.0214.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq 0$$

01.28.27.0215.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{1}{\sqrt{1-z}}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

01.28.27.0216.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) + \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.0217.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0218.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0219.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}\,\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

01.28.27.0220.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) /; 0 < \arg(z) \leq \pi \bigwedge (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0221.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i \sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0222.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0223.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) + \sqrt{\frac{1}{1-z}}\sqrt{-1+z}\sin^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

01.28.27.0224.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.0225.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i \sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0226.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0227.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) + \frac{\sqrt{1-z}\sqrt{z}}{\sqrt{-z}}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

01.28.27.0228.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i \sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.0229.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i \sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0230.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0231.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) - \frac{\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z}+1} \middle/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0232.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\sqrt[4]{1-z}}\right) + \pi i \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0233.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \pi i \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.0234.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z}-1} \middle/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0235.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0236.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.0237.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z}+1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0238.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) + \pi\,i\;/;\;0 < \arg(z) \le \pi$$

01.28.27.0239.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \pi\,i\;/;\;-\pi < \arg(z) \le 0$$

01.28.27.0240.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z}-1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0241.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right)\;/;\;0 < \arg(z) \le \pi$$

01.28.27.0242.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right)\;/;\;-\pi < \arg[z] \le 0$$

01.28.27.0243.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z}+\sqrt{-z}}\;/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0244.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi\,i}{2}\;/;\;0 < \arg(z) \le \pi$$

01.28.27.0245.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi\,i}{2}\;/;\;\operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0246.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{3\,\pi\,i}{2}\;/;\;(z \in \mathbb{R} \land z > 1)$$

01.28.27.0247.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{-z^2}}{z}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}}-\frac{1}{2}\right) - \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}(1-z)^{1/4}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\sqrt{1-z}-\sqrt{-z}}\Big/\left(\sqrt{2}(1-z)^{1/4}\right)\right)$

01.28.27.0248.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}(1-z)^{1/4}}\right) + \frac{\pi i}{2} /; 0 < \arg(z) \le \pi$$

01.28.27.0249.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2i\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \le 0$$

01.28.27.0250.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{2\sqrt{-z^2}}{z}\sin^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}(1-z)^{1/4}}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z}+\sqrt{-z}\right)\Big/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0251.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \le \pi$$

01.28.27.0252.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0253.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0254.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{-z^2}}{z}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}}-\frac{1}{2}\right) - \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{\left(\sqrt{1-z}-\sqrt{-z}\right)\Big/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0255.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0256.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0257.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0258.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{2\sqrt{-z^2}\,\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\,\sin^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0259.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0260.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -i\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0261.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi\,i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0262.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi\,i}{2}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}} - 1\right) + \frac{\sqrt{z-1}}{\sqrt{1-z}}\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0263.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i\sin^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.0264.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -i \sin^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0265.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i \sin^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0266.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} - 1\right) + \frac{\sqrt{z-1}}{\sqrt{1-z}} \sqrt{z} \sqrt{\frac{1}{z}} \sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0267.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -\frac{\pi i}{2} + i \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0268.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi i}{2} - i \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0269.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}} \sin^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi \sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0270.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -\frac{\pi i}{2} + i \sin^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0271.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi i}{2} - i \sin^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0272.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -\frac{\pi i}{2} - i \sin^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0273.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\sqrt{z-1}\,\sqrt{z}}{\sqrt{1-z}}\sqrt{\frac{1}{z}}\,\sin^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\sin^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0274.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\frac{\pi i}{2} + i\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) /;\ 0 \le \arg(z) \le \pi$$

01.28.27.0275.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\pi i}{2} - i\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) /;\ \mathrm{Im}(z) < 0$$

01.28.27.0276.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \sqrt{z}\sqrt{-\frac{1}{z}}\,\sin^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\sin^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0277.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\frac{\pi i}{2} + i\sin^{-1}\left(\sqrt{\frac{1}{z}}\right) /;\ 0 \le \arg(z) < \pi$$

01.28.27.0278.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\pi i}{2} - i\sin^{-1}\left(\sqrt{\frac{1}{z}}\right) /;\ \mathrm{Im}(z) < 0$$

01.28.27.0279.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\frac{\pi i}{2} - i\sin^{-1}\left(\sqrt{\frac{1}{z}}\right) /;\ (z \in \mathbb{R} \land z < 0)$$

01.28.27.0280.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \sqrt{z-1}\sqrt{\frac{1}{z}}\sqrt{\frac{z}{1-z}}\,\sin^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{1}{2}\pi\sqrt{\frac{1}{1-z}}\sqrt{z-1}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\sin^{-1}\left(\sqrt{z}\right)$

01.28.27.0281.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -i \sin^{-1}\left(\sqrt{z}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0282.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = i \sin^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0283.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = i \sin^{-1}\left(\sqrt{z}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0284.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\sqrt{1-z}}{\sqrt{z-1}} \sin^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\sin^{-1}\left(\sqrt{z}\right)$

01.28.27.0285.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i \sin^{-1}\left(\sqrt{z}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.0286.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i \sin^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0287.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i \sin^{-1}\left(\sqrt{z}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0288.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\sqrt{-z^2}}{z} \sin^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\sin^{-1}\left(\sqrt{z}\right)$

01.28.27.0289.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i \sin^{-1}\left(\sqrt{z}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.0290.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i \sin^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0291.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i \sin^{-1}\left(\sqrt{z}\right) - \pi i /; (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.0292.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -\frac{\sqrt{z-1}}{\sqrt{1-z}} \sin^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2}\left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\sin^{-1}\left(\sqrt{z}\right)$

01.28.27.0293.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2} - i \sin^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.0294.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -\frac{\pi i}{2} + i \sin^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.0295.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -\frac{\pi i}{2} - i \sin^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \wedge z < 0)$$

01.28.27.0296.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(1 + i \sqrt{-z} \sqrt{\frac{1}{z}} - \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}}\right) - \frac{\sqrt{-1+z}}{\sqrt{1-z}} \sin^{-1}\left(\sqrt{z}\right)$$

01.28.27.0297.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z} \sqrt{\frac{1}{z}} - \frac{i \sqrt{z-1}}{\sqrt{1-z}} - 1\right) - \frac{\sqrt{z-1}}{\sqrt{1-z}} \sin^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\sin^{-1}\left(\sqrt{z}\right)$

01.28.27.0298.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \frac{\pi i}{2} - i \sin^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0299.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -\frac{\pi i}{2} + i \sin^{-1}\left(\sqrt{z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.0300.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -\frac{\pi i}{2} - i \sin^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0301.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \frac{\sqrt{-z}}{\sqrt{z}} \sin^{-1}\left(\sqrt{z}\right) - \frac{\pi \sqrt{-z}}{2} \sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\sin^{-1}\left(\sqrt{z}\right)$

01.28.27.0302.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \frac{\pi i}{2} - i \sin^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0303.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -\frac{\pi i}{2} + i \sin^{-1}\left(\sqrt{z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.0304.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -\frac{\pi i}{2} - i \sin^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0305.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -\frac{\sqrt{z}}{\sqrt{-z}} \sin^{-1}\left(\sqrt{z}\right) - \frac{\pi \sqrt{-z}}{2} \sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z+a}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$ and $\sin^{-1}(z)$

01.28.27.0306.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = -\frac{i}{2}\sin^{-1}(z) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.0307.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{i}{2}\sin^{-1}(z) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0308.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = -\frac{i}{2}\sin^{-1}(z) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0309.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + \frac{i\sqrt{1-z}}{2\sqrt{z-1}} - 1\right) + \frac{\sqrt{1-z}}{2\sqrt{z-1}}\sin^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$ and $\sin^{-1}(z)$

01.28.27.0310.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = -\frac{i}{2}\sin^{-1}(z) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0311.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2}i\sin^{-1}(z) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.0312.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2}i\sin^{-1}(z) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0313.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} - \sqrt{z}\sqrt{-\frac{1}{z}}\right) - \frac{\sqrt{z-1}}{2\sqrt{1-z}}\sin^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-a-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$ and $\sin^{-1}(z)$

01.28.27.0314.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{i}{2}\sin^{-1}(z) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.0315.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{i}{2}\sin^{-1}(z) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.0316.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{i}{2}\sin^{-1}(z) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0317.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{\pi i}{4}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + i\sqrt{-z}\sqrt{\frac{1}{z}} - 1\right) + \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\sin^{-1}(z)$$

01.28.27.0318.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\sin^{-1}(z) - \frac{\pi i}{2}\left(1 - \frac{i\sqrt{-z-1}}{2\sqrt{z+1}} - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$ and $\sin^{-1}(z)$

01.28.27.0319.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2} i \sin^{-1}(z) - \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0320.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2} i \sin^{-1}(z) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.0321.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2} i \sin^{-1}(z) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0322.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\sin^{-1}(z) - \frac{\pi}{2}\left(\frac{\sqrt{-z}\, z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\sqrt{-\frac{1}{z}} + \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-a}{z+a}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$ and $\sin^{-1}(z)$

01.28.27.0323.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{i}{2}\sin^{-1}(z) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0$$

01.28.27.0324.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{i}{2}\sin^{-1}(z) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.0325.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{i}{2}\sin^{-1}(z) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0326.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\sin^{-1}(z) - \left(1 - i\frac{\sqrt{-1-z}}{2\sqrt{z+1}} - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right)\frac{\pi i}{2}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$ and $\sin^{-1}(z)$

01.28.27.0327.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{1}{2}i\sin^{-1}(z) - \frac{\pi i}{4} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0328.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}i\sin^{-1}(z) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0$$

01.28.27.0329.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}i\sin^{-1}(z) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0330.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + i\sqrt{z}\sqrt{-\frac{1}{z}} - 1\right) + \frac{\sqrt{1-z}}{2\sqrt{z-1}}\sin^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$ and $\sin^{-1}\left(\frac{1}{z}\right)$

01.28.27.0331.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = i\sin^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0332.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -i\sin^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0333.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -i\sin^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0334.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = i\sin^{-1}\left(\frac{1}{z}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0335.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \frac{\sqrt{z^2}\sqrt{z^2-1}}{z\sqrt{1-z^2}}\sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}\left(\frac{\sqrt{-z-1}}{\sqrt{z+1}} + \frac{\sqrt{z-1}}{\sqrt{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$ and $\sin^{-1}\left(\frac{1}{z}\right)$

01.28.27.0336.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i\sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0337.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i\sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0338.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i\sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0339.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i\sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0340.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi\sqrt{1-z^2}}{2\sqrt{z^2-1}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$ and $\sin^{-1}\left(\frac{1}{z}\right)$

01.28.27.0341.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) == i\sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0342.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) == -i\sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0343.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) == i\sin^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0344.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) == -i\sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0345.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) == \sqrt{-\frac{1}{z^2}}\, z\sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{z^2}}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$ and $\sin^{-1}\left(\frac{1}{z}\right)$

01.28.27.0346.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) == -\frac{\pi i}{2} + i\sin^{-1}\left(\frac{1}{z}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0347.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) == \frac{\pi i}{2} - i\sin^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0348.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) == -\frac{\pi i}{2} - i\sin^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0349.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \frac{\pi i}{2} + i\sin^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0350.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \sqrt{z^2}\sqrt{-\frac{1}{z^2}}\sin^{-1}\left(\frac{1}{z}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$ and $\sin^{-1}(z)$

01.28.27.0351.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi i}{2} - i\sin^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1) \bigvee (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.0352.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\frac{\pi i}{2} + i\sin^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0353.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi i}{2} + i\sin^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0354.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\frac{\pi i}{2} - i\sin^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0) \bigvee (i z \in \mathbb{R} \land i z < 0)$$

01.28.27.0355.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(\frac{\pi z}{2}\sqrt{\frac{1}{z^2}} - \sin^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$ and $\sin^{-1}(z)$

01.28.27.0356.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi i}{2} - i\sin^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0357.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -\frac{\pi i}{2} + i\sin^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0358.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -\frac{\pi i}{2} - i\sin^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0359.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi i}{2} + i\sin^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0360.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(\frac{\pi\sqrt{z^2}}{2}\sqrt{\frac{1}{z^2}} - \frac{\sqrt{z^2}}{z}\sin^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$ and $\sin^{-1}(z)$

01.28.27.0361.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi i}{2} - i\sin^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.0362.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -\frac{\pi i}{2} + i\sin^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.28.27.0363.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -\frac{\pi i}{2} - i\sin^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.0364.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi i}{2} + i\sin^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.0365.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\sqrt{-z}}{\sqrt{z}}\sin^{-1}(z) - \frac{1}{2}\pi\sqrt{-z^2}\sqrt{\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$ and $\sin^{-1}(z)$

01.28.27.0366.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\pi i}{2} - i\sin^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.0367.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -\frac{\pi i}{2} + i\sin^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.28.27.0368.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -\frac{\pi i}{2} - i\sin^{-1}(z) /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.0369.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\pi i}{2} + i\sin^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.0370.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\sqrt{-z^2}}{z}\sin^{-1}(z) - \frac{\pi\sqrt{-z^2}}{2}\sqrt{\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$ and $\sin^{-1}(z)$

01.28.27.0371.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i\sin^{-1}(z) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.0372.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) == i\sin^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0373.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) == i\sin^{-1}(z) + \pi\, i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0374.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) == i\sin^{-1}(z) - \pi\, i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0010.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) == \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} \sin^{-1}(z) /; z \notin (-\infty, -1) \bigwedge z \notin (1, \infty)$$

01.28.27.0011.02

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) == \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} \sin^{-1}(z) + \frac{\pi\, i}{2}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - \sqrt{z+1}\,\sqrt{\frac{1}{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$ and $\sin^{-1}(z)$

01.28.27.0375.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) == -i\sin^{-1}(z) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0376.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) == i\sin^{-1}(z) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0377.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) == -i\sin^{-1}(z) - \pi\, i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0378.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) == i\sin^{-1}(z) - \pi\, i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0379.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - 1\right) + \frac{\sqrt{z^2-z^4}}{z\sqrt{z^2-1}}\sin^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$ and $\sin^{-1}(z)$

01.28.27.0380.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i\sin^{-1}(z) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0381.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i\sin^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0382.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i\sin^{-1}(z) - \pi i \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0383.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i\sin^{-1}(z) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0384.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - 1\right) + \frac{\sqrt{-z}}{\sqrt{z}}\sin^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$ and $\sin^{-1}(z)$

01.28.27.0385.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -i\sin^{-1}(z) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0386.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i\sin^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0387.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -i\sin^{-1}(z) - \pi\, i \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0388.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i\sin^{-1}(z) - \pi\, i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0389.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi\, i}{2}\left(\sqrt{1-z^2}\,\sqrt{\frac{1}{1-z^2}} - 1\right) - \frac{z\sqrt{-1+z^2}}{\sqrt{z^2-z^4}}\sin^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$ and $\sin^{-1}(i\, z)$

01.28.27.0390.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = -\frac{i}{2}\sin^{-1}(i\, z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right)$ and $\sin^{-1}(i\, z)$

01.28.27.0391.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi\, i}{2} - \frac{1}{2}\, i\sin^{-1}(i\, z) \;/;\; 0 \le \arg(z) < \pi$$

01.28.27.0392.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi\, i}{2} - \frac{1}{2}\, i\sin^{-1}(i\, z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0393.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z - \frac{1}{2}\, i\sin^{-1}(i\, z)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right)$ and $\sin^{-1}(i\,z)$

01.28.27.0394.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi i}{2} - \frac{1}{2} i \sin^{-1}(i\,z) \;/;\; 0 \leq \arg(z) < \pi$$

01.28.27.0395.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{\pi i}{2} - \frac{1}{2} i \sin^{-1}(i\,z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0396.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z - \frac{1}{2} i \sin^{-1}(i\,z)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right)$ and $\sin^{-1}(i\,z)$

01.28.27.0397.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = -\frac{i}{2} \sin^{-1}(i\,z)$$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right)$ and $\sin^{-1}\left(\frac{1}{z}\right)$

01.28.27.0398.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = \frac{\pi i}{2} - 2 i \sin^{-1}\left(\frac{1}{z}\right) \;/;\; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0399.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = -\frac{\pi i}{2} + 2 i \sin^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0400.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = -\frac{\pi i}{2} - 2 i \sin^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0401.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = \frac{\pi i}{2} + 2 i \sin^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.0402.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = i\pi\left(1 - \frac{i\sqrt{z^2}}{2\sqrt{-z^2}} - \sqrt{\frac{z^2}{z^2-1}}\sqrt{\frac{z^2-1}{z^2}}\right) - \frac{2z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\sin^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right)$ and $\sin^{-1}\left(\frac{1}{z}\right)$

01.28.27.0403.01

$$\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right) = -2 i \sin^{-1}\left(\frac{1}{z}\right) /; |z| > \sqrt{2} \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0404.01

$$\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right) = 2 i \sin^{-1}\left(\frac{1}{z}\right) /; |z| > \sqrt{2} \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0405.01

$$\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\pi\left(\theta\left(\left|\sqrt{z^2-1}\right|-1\right)-1\right) + \frac{2\sqrt{z^2}}{z}\sin^{-1}\left(\frac{1}{z}\right)\right)$$

01.28.27.0406.01

$$\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right) = -\frac{\pi}{2\sqrt{1-z^2}}\left((z^2-2)\sqrt{\frac{z^4}{z^2-1}}\sqrt{\frac{z^2-1}{z^4}}\sqrt{\frac{z^2-1}{(z^2-2)^2}} - \sqrt{1-\frac{1}{z^2}}\, z\left(\sqrt{\frac{1}{z^2}}\, z - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + \sqrt{\frac{i}{z}}\sqrt{-i z} - \sqrt{-\frac{i}{z}}\sqrt{i z} + \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right)\right) - \frac{2z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\sin^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$ and $\sin^{-1}(z)$

01.28.27.0407.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{\pi i}{2} + 2i\sin^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1) \bigvee (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.0408.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} - 2i\sin^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0409.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{\pi i}{2} - 2i\sin^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0410.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} + 2i\sin^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0) \bigvee (i z \in \mathbb{R} \land i z < 0)$$

01.28.27.0411.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{3\pi i}{2} - 2i\sin^{-1}(z) /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0412.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{3\pi i}{2} - 2i\sin^{-1}(z) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0413.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) =$$

$$\frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\frac{\pi}{2}\left(-\sqrt{\frac{1}{1-z}}\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\sqrt{z+1} - \sqrt{-i z}\sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}}\sqrt{i z} + \frac{\sqrt{z^2}}{z}\right) - 2\sin^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$ and $\sin^{-1}(z)$

01.28.27.0414.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = 2\,i\sin^{-1}(z)\;/;\;\frac{\pi}{4}\le\arg(z)\le\frac{\pi}{2}\bigvee-\frac{3\pi}{4}\le\arg(z)\le-\frac{\pi}{2}$$

01.28.27.0415.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(2\sin^{-1}(z)-\frac{\pi}{2}\left(\frac{\sqrt{z^2-1}\,z}{\sqrt{z^4-z^2}}+\sqrt{\frac{1}{z}}\sqrt{\frac{1}{\sqrt{2}\,z-1}}\sqrt{\sqrt{2}\,z-1}\sqrt{z}-\sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{-\sqrt{2}\,z-1}\sqrt{-\frac{1}{\sqrt{2}\,z+1}}+\frac{\sqrt{z^2}}{z}\right)\right)$$

Involving $\cos^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\frac{2iz}{1-z^2}\right)$

01.28.27.0416.01

$$\coth^{-1}(z) = \frac{i}{2}\cos^{-1}\left(\frac{2\,i\,z}{1-z^2}\right)+\frac{\pi\,i}{4}\;/;\;|z|<1\land(\operatorname{Im}(z)<0\lor(z\in\mathbb{R}\land-1<z<0))$$

01.28.27.0417.01

$$\coth^{-1}(z) = \frac{i}{2}\cos^{-1}\left(\frac{2\,i\,z}{1-z^2}\right)-\frac{3\pi\,i}{4}\;/;\;|z|<1\bigwedge 0\le\arg(z)<\pi$$

01.28.27.0418.01

$$\coth^{-1}(z) = -\frac{\pi}{2}\left(z\sqrt{-\frac{1}{z^2}}+\frac{i}{2}\right)+\frac{1}{2}\,i\cos^{-1}\left(\frac{2\,i\,z}{1-z^2}\right)\;/;\;|z|<1$$

01.28.27.0419.01

$$\coth^{-1}(z) = \frac{i}{2}\left(\frac{\pi}{2}-\cos^{-1}\left(\frac{2\,i\,z}{1-z^2}\right)\right)\;/;\;|z|>1$$

01.28.27.0420.01

$$\coth^{-1}(z) = \frac{1}{4}\pi\left(\frac{z-1}{z+1}\sqrt{\left(\frac{z+1}{z-1}\right)^2}\left(i+\sqrt{-\frac{1}{z^2}}\,z\right)-\sqrt{-\frac{1}{z^2}}\,z\right)-\frac{i(z-1)}{2(z+1)}\sqrt{\left(\frac{z+1}{z-1}\right)^2}\cos^{-1}\left(\frac{2\,i\,z}{1-z^2}\right)\;/;\;|z|\ne1$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\frac{2iz}{z^2-1}\right)$

01.28.27.0421.01

$$\coth^{-1}(z) = -\frac{i}{2}\cos^{-1}\left(\frac{2\,i\,z}{z^2-1}\right) + \frac{3\,\pi\,i}{4} \;/;\; |z| < 1 \land (\mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0))$$

01.28.27.0422.01

$$\coth^{-1}(z) = -\frac{i}{2}\cos^{-1}\left(\frac{2\,i\,z}{z^2-1}\right) - \frac{\pi\,i}{4} \;/;\; |z| < 1 \bigwedge 0 \le \arg(z) < \pi$$

01.28.27.0423.01

$$\coth^{-1}(z) = \frac{\pi}{2}\left(-z\sqrt{-\frac{1}{z^2}} + \frac{i}{2}\right) - \frac{1}{2}\,i\cos^{-1}\left(\frac{2\,i\,z}{z^2-1}\right) /;\; |z| < 1$$

01.28.27.0424.01

$$\coth^{-1}(z) = \frac{i}{2}\left(\cos^{-1}\left(\frac{2\,i\,z}{z^2-1}\right) - \frac{\pi}{2}\right) /;\; |z| > 1$$

01.28.27.0425.01

$$\coth^{-1}(z) = \frac{\pi}{4}\left(-\sqrt{-\frac{1}{z^2}}\,z + \frac{z-1}{z+1}\sqrt{\left(\frac{1+z}{-1+z}\right)^2}\left(-i + \sqrt{-\frac{1}{z^2}}\,z\right)\right) + \frac{i\,(z-1)}{2\,(z+1)}\sqrt{\left(\frac{1+z}{-1+z}\right)^2}\cos^{-1}\left(\frac{2\,i\,z}{z^2-1}\right) /;\; |z| \neq 1$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\frac{1+z^2}{1-z^2}\right)$

01.28.27.0426.01

$$\coth^{-1}(z) = -\frac{\pi\,i}{2} + \frac{1}{2}\,i\cos^{-1}\left(\frac{1+z^2}{1-z^2}\right) /;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0427.01

$$\coth^{-1}(z) = \frac{\pi\,i}{2} - \frac{1}{2}\,i\cos^{-1}\left(\frac{1+z^2}{1-z^2}\right) /;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0428.01

$$\coth^{-1}(z) = -\frac{\pi\,i}{2} - \frac{1}{2}\,i\cos^{-1}\left(\frac{1+z^2}{1-z^2}\right) /;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0429.01

$$\coth^{-1}(z) = \frac{\pi\,i}{2} + \frac{1}{2}\,i\cos^{-1}\left(\frac{1+z^2}{1-z^2}\right) /;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0430.01

$$\coth^{-1}(z) = -\frac{\sqrt{-z^2}\,\sqrt{1-z^2}}{2\,z}\sqrt{\frac{1}{1-z^2}}\cos^{-1}\left(\frac{1+z^2}{1-z^2}\right) - \frac{\pi\,z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\frac{z^2+1}{z^2-1}\right)$

01.28.27.0431.01

$$\coth^{-1}(z) = -\frac{1}{2}\,i\cos^{-1}\left(\frac{z^2+1}{z^2-1}\right) /;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0432.01

$$\coth^{-1}(z) = \frac{1}{2}\, i \cos^{-1}\left(\frac{z^2+1}{z^2-1}\right) /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0433.01

$$\coth^{-1}(z) = -\pi\, i + \frac{1}{2}\, i \cos^{-1}\left(\frac{z^2+1}{z^2-1}\right) /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0434.01

$$\coth^{-1}(z) = \pi\, i - \frac{1}{2}\, i \cos^{-1}\left(\frac{z^2+1}{z^2-1}\right) /;\ (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0435.01

$$\coth^{-1}(z) = \frac{\pi\, i}{2}\left(\sqrt{\frac{z}{z-1}}\,\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\,\sqrt{\frac{z+1}{z}}\right) + \frac{\sqrt{-z^2}}{2\, z}\,\sqrt{1-z^2}\,\sqrt{\frac{1}{1-z^2}}\,\cos^{-1}\left(\frac{z^2+1}{z^2-1}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

01.28.27.0436.01

$$\coth^{-1}(z) = i \cos^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) - \frac{\pi\, i}{2} /;\ \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0437.01

$$\coth^{-1}(z) = \frac{\pi\, i}{2} - i \cos^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0438.01

$$\coth^{-1}(z) = \frac{\pi\, i}{2} + i \cos^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /;\ (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0439.01

$$\coth^{-1}(z) = -\frac{\pi\, i}{2} - i \cos^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0440.01

$$\coth^{-1}(z) = \frac{\pi\, i}{2}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\,\sqrt{\frac{z}{z+1}} - \frac{i\sqrt{-z^2}}{z}\right) - \frac{\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

01.28.27.0441.01

$$\coth^{-1}(z) = i \cos^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0442.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - i \cos^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0443.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + i \cos^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0444.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - i \cos^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0445.01

$$\coth^{-1}(z) = -\frac{1}{2} \pi \sqrt{-\frac{1}{z^2}}\, z - \frac{\sqrt{-z^2}\, \sqrt{1-z^2}}{z} \sqrt{\frac{1}{1-z^2}}\, \cos^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

01.28.27.0446.01

$$\coth^{-1}(z) = i \cos^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0447.01

$$\coth^{-1}(z) = -i \cos^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) \;/;\; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.0448.01

$$\coth^{-1}(z) = i \cos^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) - \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0449.01

$$\coth^{-1}(z) = -i \cos^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) + \pi i \;/;\; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0450.01

$$\coth^{-1}(z) = \frac{\pi}{2}\left(\sqrt{z^2} - z\right)\sqrt{-\frac{1}{z^2}} - \sqrt{z^2}\, \sqrt{-\frac{1}{z^2}}\, \cos^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

01.28.27.0451.01

$$\coth^{-1}(z) = -i\cos^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) /;\ 0 \leq \arg(z) < \pi$$

01.28.27.0452.01

$$\coth^{-1}(z) = i\cos^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0453.01

$$\coth^{-1}(z) = -\sqrt{-\frac{1}{z^2}}\ z\cos^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

01.28.27.0454.01

$$\coth^{-1}(z) = -i\cos^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) /;\ \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0455.01

$$\coth^{-1}(z) = i\cos^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0456.01

$$\coth^{-1}(z) = i\cos^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) - \pi i /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0457.01

$$\coth^{-1}(z) = -i\cos^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) + \pi i /;\ (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0458.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}\right) - \sqrt{\frac{z^2-1}{z^2}}\sqrt{\frac{z^2}{z^2-1}}\sqrt{-\frac{1}{z^2}}\ z\cos^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

01.28.27.0459.01

$$\coth^{-1}(z) = -i \cos^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0460.01

$$\coth^{-1}(z) = i \cos^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0461.01

$$\coth^{-1}(z) = i \cos^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0462.01

$$\coth^{-1}(z) = -i \cos^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) + \pi i /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0463.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}\right) - \sqrt{\frac{z^2-1}{z^2}}\sqrt{\frac{z^2}{z^2-1}}\sqrt{-\frac{1}{z^2}}\, z \cos^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z^2}+1} \Big/ \left(\sqrt{2}\,(1-z^2)^{1/4}\right)\right)$

01.28.27.0464.01

$$\coth^{-1}(z) = 2 i \cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0465.01

$$\coth^{-1}(z) = -2 i \cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0466.01

$$\coth^{-1}(z) = 2 i \cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0467.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0468.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{\pi\,i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} - \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z^2}-1}\Big/\left(\sqrt{2}\,(1-z^2)^{1/4}\right)\right)$

01.28.27.0469.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0470.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) - \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0471.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) - \frac{3\,\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0472.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{3\,\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0473.01

$$\coth^{-1}(z) = \frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{\pi\,i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z^2}+1\right)\Big/\left(2\sqrt{1-z^2}\right)}\right)$

01.28.27.0474.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0475.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0476.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0477.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0478.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} - \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z^2}-1\right)\Big/\left(2\sqrt{1-z^2}\right)}\right)$

01.28.27.0479.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0480.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0481.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0482.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) + \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0483.01

$$\coth^{-1}(z) = \frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\sqrt{z^2-1}+z} \Big/ \left(\sqrt{2}\,(z^2-1)^{1/4}\right)\right)$

01.28.27.0484.01

$$\coth^{-1}(z) = \pi i - 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) - \pi i \;/;\; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.0485.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0486.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) - \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0487.01

$$\coth^{-1}(z) = \pi i - 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) \;/;\; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0488.01

$$\coth^{-1}(z) = \frac{1}{2}\pi\sqrt{-z}\left(1 - \frac{\sqrt{z^2}}{z}\right)\sqrt{\frac{1}{z}} - 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\cos^{-1}\left(\frac{\sqrt{z+\sqrt{z^2-1}}}{\sqrt{2}\sqrt[4]{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\sqrt{z^2-1}-z} \Big/ \left(\sqrt{2}\,(z^2-1)^{1/4}\right)\right)$

01.28.27.0489.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) - \pi\,i \;/;\; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.0490.01

$$\coth^{-1}(z) = \pi\,i - 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0491.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0492.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /;\; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0493.01

$$\coth^{-1}(z) = 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\cos^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,\sqrt[4]{z^2-1}}\right) - \frac{1}{2}\pi\sqrt{-\frac{1}{z}}\sqrt{z}\left(\frac{\sqrt{z^2}}{z}+1\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{z^2-1}+z\right) \Big/ \left(2\sqrt{z^2-1}\right)}\right)$

01.28.27.0494.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /;\; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.0495.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0496.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) - \pi\,i /;\ \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0497.01

$$\coth^{-1}(z) = \pi\,i - 2\,i\cos^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0498.01

$$\coth^{-1}(z) = \frac{1}{2}\pi\sqrt{-z}\left(1-\frac{\sqrt{z^2}}{z}\right)\sqrt{\frac{1}{z}} - 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\cos^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}(z)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{z^2-1}-z\right)\Big/\left(2\sqrt{z^2-1}\right)}\right)$

01.28.27.0499.01

$$\coth^{-1}(z) = -\pi\,i + 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /;\ 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0500.01

$$\coth^{-1}(z) = \pi\,i - 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0501.01

$$\coth^{-1}(z) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /;\ \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0502.01

$$\coth^{-1}(z) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0503.01

$$\coth^{-1}(z) = 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\cos^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) - \frac{1}{2}\pi\sqrt{-\frac{1}{z}}\sqrt{z}\left(\frac{\sqrt{z^2}}{z}+1\right)$$

Involving $\coth^{-1}(\sqrt{z})$

Involving $\coth^{-1}(\sqrt{z})$ and $\cos^{-1}\left(\frac{1+z}{1-z}\right)$

01.28.27.0504.01

$$\coth^{-1}(\sqrt{z}) = \frac{i}{2}\cos^{-1}\left(\frac{z+1}{1-z}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0505.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}i\cos^{-1}\left(\frac{z+1}{1-z}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.0506.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}i\cos^{-1}\left(\frac{z+1}{1-z}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0507.01

$$\coth^{-1}(\sqrt{z}) = -\frac{\sqrt{1-z}\sqrt{-z^2}}{2z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\frac{1+z}{1-z}\right) - \frac{1}{2}\sqrt{z}\sqrt{-\frac{1}{z}}\pi$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cos^{-1}\left(\frac{z+1}{z-1}\right)$

01.28.27.0508.01

$$\coth^{-1}(\sqrt{z}) = -\frac{i}{2}\cos^{-1}\left(\frac{z+1}{z-1}\right) \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0509.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}i\cos^{-1}\left(\frac{z+1}{z-1}\right) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.0510.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}i\cos^{-1}\left(\frac{z+1}{z-1}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0511.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - 1\right) + \frac{\sqrt{1-z}\sqrt{-z^2}}{2z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\frac{z+1}{z-1}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$

01.28.27.0512.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\,i\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi i}{4} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0513.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) + \frac{\pi i}{4} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.0514.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0515.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi}{2}\left(\sqrt{z}\sqrt{-\frac{1}{z}} + \frac{\sqrt{-z^2}}{2z}\right) \;/;\; |z| < 1$$

01.28.27.0516.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi i}{4} \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0517.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{4} - \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0518.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z}\left(\frac{\pi}{2} - \cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)\right) \;/;\; |z| > 1$$

01.28.27.0519.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi}{4}\left(\frac{i(1+z)}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\left(1-\sqrt{-z}\sqrt{-\frac{1}{z}}\right) + \sqrt{-\frac{1}{z}}\sqrt{z}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$

01.28.27.0520.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\,i\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{3\pi i}{4} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0521.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{3\pi i}{4} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.0522.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0523.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi}{2}\left(\frac{\sqrt{-z^2}}{2z} - \sqrt{z}\sqrt{-\frac{1}{z}}\right) - \frac{\sqrt{-z^2}}{2z}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) \;/;\; |z| < 1$$

01.28.27.0524.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{4} - \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0525.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi i}{4} \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0526.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z}\left(\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi}{2}\right) \;/;\; |z| > 1$$

01.28.27.0527.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}\,(1+z)}{2\,(z\,(1-z))}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\left(\frac{\pi}{2} - \cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)\right) - \frac{\pi\sqrt{z}}{4}\sqrt{-\frac{1}{z}}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

01.28.27.0528.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} + i\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0529.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0530.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0531.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right) - \frac{1}{2}\pi\sqrt{\frac{1}{1-z}}\sqrt{-\frac{1}{z}}\sqrt{(1-z)\,z}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

01.28.27.0532.01

$$\coth^{-1}\left(\sqrt{z}\right) = i \cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0533.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} - i \cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0534.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i \cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0535.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{-z^2}\ \sqrt{1-z}}{z} \sqrt{\frac{1}{1-z}} \cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \frac{1}{2} \pi \sqrt{-\frac{1}{z}} \sqrt{z}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

01.28.27.0536.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i \cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) /; \operatorname{Im}(z) \geq 0$$

01.28.27.0537.01

$$\coth^{-1}\left(\sqrt{z}\right) = i \cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0538.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\sqrt{z} \sqrt{-\frac{1}{z}} \cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

01.28.27.0539.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i \cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0540.01

$$\coth^{-1}\left(\sqrt{z}\right) = i \cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0541.01

$$\coth^{-1}\left(\sqrt{z}\right) = i \cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0542.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\sqrt{z-1}\,\sqrt{-\frac{1}{z}}\,\sqrt{\frac{z}{z-1}}\,\cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{-1+z}}\,\sqrt{\frac{z-1}{z}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

01.28.27.0543.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right) /;\ 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0544.01

$$\coth^{-1}\left(\sqrt{z}\right) = i\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right) /;\ \operatorname{Im}(z) < 0$$

01.28.27.0545.01

$$\coth^{-1}\left(\sqrt{z}\right) = i\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \pi i /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0546.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{1-z}\,\sqrt{-z^2}}{z}\sqrt{\frac{1}{1-z}}\,\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\,\sqrt{\frac{z-1}{z}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z}+1} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0547.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi i}{2} /;\ 0 < \arg(z) \le \pi$$

01.28.27.0548.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi i}{2} /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0549.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi i}{2} /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0550.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi\sqrt{-1+z}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z}-1} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0551.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0552.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0553.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{3\,\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0554.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi}{2}\left(\frac{\sqrt{-1+z}}{\sqrt{1-z}} + \frac{2\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z}+1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0555.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0556.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0557.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0558.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{\pi\sqrt{-1+z}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z}-1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0559.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0560.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0561.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{3\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0562.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{\pi}{2}\left(\frac{\sqrt{-1+z}}{\sqrt{1-z}} + \frac{2\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z}+\sqrt{-z}} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0563.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0564.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.0565.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \pi\,i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0566.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi\,i}{2}\left(1 - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right) + \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,\sqrt[4]{1-z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z}-\sqrt{-z}} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0567.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \pi\,i \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.0568.01

$$\coth^{-1}\left(\sqrt{z}\right) = \pi\,i - 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0569.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right)/;\ (z\in\mathbb{R}\land 0<z<1)$$

01.28.27.0570.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi\,i}{2}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}}-\frac{2\,i\sqrt{-z^2}}{z}-1\right)-\frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z}+\sqrt{-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0571.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)/;\ 0<\arg(z)\le\pi\lor(z\in\mathbb{R}\land z>1)$$

01.28.27.0572.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)/;\ \operatorname{Im}(z)<0$$

01.28.27.0573.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)-\pi\,i\ /;\ (z\in\mathbb{R}\land 0<z<1)$$

01.28.27.0574.01

$$\coth^{-1}(\sqrt{z}) = \left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}}-1\right)\frac{\pi\,i}{2}+\frac{2\sqrt{-z^2}\,\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z}-\sqrt{-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0575.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right)-\pi\,i\ /;\ 0<\arg(z)\le\pi\lor(z\in\mathbb{R}\land z>1)$$

01.28.27.0576.01

$$\coth^{-1}(\sqrt{z}) = \pi\,i-2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right)/;\ \operatorname{Im}(z)<0$$

01.28.27.0577.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right)/;\ (z\in\mathbb{R}\land 0<z<1)$$

01.28.27.0578.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \frac{2 i \sqrt{-z^2}}{z}\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) - \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\frac{1+z}{1-z}\right)$

01.28.27.0579.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\cos^{-1}\left(\frac{1+z}{1-z}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.0580.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\cos^{-1}\left(\frac{1+z}{1-z}\right) /; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0581.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\cos^{-1}\left(\frac{1+z}{1-z}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0582.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) - \frac{\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\frac{1+z}{1-z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\frac{z+1}{z-1}\right)$

01.28.27.0583.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\cos^{-1}\left(\frac{z+1}{z-1}\right) + \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.0584.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\cos^{-1}\left(\frac{z+1}{z-1}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0585.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\cos^{-1}\left(\frac{z+1}{z-1}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0586.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi\sqrt{-z}}{2\sqrt{z}} + \frac{\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\frac{z+1}{z-1}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$

01.28.27.0587.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} - \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) /; |z| < 1 \land 0 < \arg(z) \leq \pi$$

01.28.27.0588.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi i}{4} /; |z| < 1 \land -\pi < \arg(z) \leq 0$$

01.28.27.0589.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\left(\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi}{2}\right) /; |z| < 1$$

01.28.27.0590.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) + \frac{\pi i}{4} /; |z| > 1 \land 0 < \arg(z) \leq \pi$$

01.28.27.0591.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi i}{4} /; |z| > 1 \land -\pi < \arg(z) \leq 0$$

01.28.27.0592.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\sqrt{-z^2}}{2z}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi\sqrt{-z^2}}{4z} /; |z| > 1$$

01.28.27.0593.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\cos^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi\sqrt{-z^2}}{4z} /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$

01.28.27.0594.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi i}{4} /; |z| < 1 \land 0 < \arg(z) \leq \pi$$

01.28.27.0595.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} - \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /; |z| < 1 \land -\pi < \arg(z) \leq 0$$

01.28.27.0596.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\left(\frac{\pi}{2} - \cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)\right) /; |z| < 1$$

01.28.27.0597.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{3\pi i}{4} \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.0598.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{3\pi i}{4} \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.0599.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{3\pi\sqrt{-z^2}}{4z} \;/;\; |z| > 1$$

01.28.27.0600.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \left(-1 + 2\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right)\frac{\pi\sqrt{-z^2}}{4z} - \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\cos^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

01.28.27.0601.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0602.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right) \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.0603.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

01.28.27.0604.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0605.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right) \;/;\; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0606.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0607.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) - \frac{\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

01.28.27.0608.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0609.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.0610.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0611.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{z-1}}{2\sqrt{-z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{1}{1-z}}\sqrt{-1+z}\cos^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

01.28.27.0612.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.0613.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0614.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{2} - i\cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0615.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{z}}{2\sqrt{-z}} - \frac{\sqrt{1-z}\sqrt{z}}{\sqrt{-z}}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

01.28.27.0616.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right) /;\ 0 < \arg(z) \leq \pi$$

01.28.27.0617.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \frac{\pi i}{2} /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0618.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \frac{\pi i}{2} /;\ (z \in \mathbb{R} \land z > 1)$$

01.28.27.0619.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}} - 1\right) + \frac{\sqrt{1-z}\sqrt{-z^2}}{z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z}+1} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0620.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\sqrt[4]{1-z}}\right) /;\ 0 < \arg(z) \leq \pi$$

01.28.27.0621.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\sqrt[4]{1-z}}\right) /;\ -\pi < \arg(z) \leq 0$$

01.28.27.0622.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\sqrt[4]{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z}-1} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0623.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \pi i - 2i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) /;\ 0 < \arg(z) \leq \pi$$

01.28.27.0624.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \pi i /;\ -\pi < \arg(z) \leq 0$$

01.28.27.0625.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{z}\left(2\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right)-\pi\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z}+1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0626.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) /;\ 0 < \arg(z) \leq \pi$$

01.28.27.0627.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) /;\ -\pi < \arg(z) \leq 0$$

01.28.27.0628.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z}-1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0629.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \pi\,i - 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) /;\ 0 < \arg(z) \leq \pi$$

01.28.27.0630.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \pi\,i /;\ -\pi < \arg[z] \leq 0$$

01.28.27.0631.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{z}\left(2\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right)-\pi\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z}+\sqrt{-z}}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0632.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi\,i}{2} /;\ 0 < \arg(z) \leq \pi$$

01.28.27.0633.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0634.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi\,i}{2}\;/;\;(z \in \mathbb{R} \land z > 1)$$

01.28.27.0635.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\,z}{2\sqrt{-z^2}} + \frac{2\sqrt{-z^2}\,\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\sqrt{1-z}-\sqrt{-z}}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.0636.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi\,i}{2}\;/;\;0 < \arg(z) \le \pi$$

01.28.27.0637.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) + \frac{\pi\,i}{2}\;/;\;-\pi < \arg(z) \le 0$$

01.28.27.0638.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\cos^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z}+\sqrt{-z}\right)\Big/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0639.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi\,i}{2}\;/;\;0 < \arg(z) \le \pi$$

01.28.27.0640.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi\,i}{2}\;/;\;\mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0641.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{3\pi\,i}{2}\;/;\;(z \in \mathbb{R} \land z > 1)$$

01.28.27.0642.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi z}{2\sqrt{-z^2}} + \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{\left(\sqrt{1-z}-\sqrt{-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.0643.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0644.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0645.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0646.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi}{2}\left(\frac{2\sqrt{-z^2}}{z}\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{\sqrt{-z^2}}{z}\right) - \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\cos^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0647.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.0648.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i\cos^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0649.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -i\cos^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0650.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -\frac{\pi\sqrt{-z}}{2\sqrt{z}} - \frac{\sqrt{z-1}}{\sqrt{1-z}}\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0651.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0652.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0653.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0654.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -\frac{\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}}\sqrt{\frac{1}{z}}\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{1}{2}\pi\sqrt{\frac{1}{z}}\sqrt{-z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0655.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -i\cos^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0656.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i\cos^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0657.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -\frac{\sqrt{z-1}}{\sqrt{1-z}}\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0658.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0659.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0660.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -\pi i + i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0661.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right) - \frac{\sqrt{z-1}}{\sqrt{1-z}}\sqrt{z}\sqrt{\frac{1}{z}}\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0662.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -i\cos^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) \geq 0$$

01.28.27.0663.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i\cos^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0664.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\sqrt{z}\sqrt{-\frac{1}{z}}\cos^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0665.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) /; 0 \leq \arg(z) < \pi$$

01.28.27.0666.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0667.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\pi i + i\cos^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0668.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}}-1\right) - \sqrt{z-1}\sqrt{\frac{1}{z}}\sqrt{\frac{z}{1-z}}\cos^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\cos^{-1}\left(\sqrt{z}\right)$

01.28.27.0669.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = i\cos^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.0670.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.0671.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -i\cos^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.0672.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -\frac{\sqrt{1-z}}{\sqrt{z-1}}\cos^{-1}\left(\sqrt{z}\right) - \frac{1}{2}\pi\sqrt{z}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\cos^{-1}\left(\sqrt{z}\right)$

01.28.27.0673.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i\cos^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.0674.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.0675.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i\cos^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.0676.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi\sqrt{1-z}\sqrt{-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}} - \frac{\sqrt{-z^2}}{z}\cos^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\cos^{-1}\left(\sqrt{z}\right)$

01.28.27.0677.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i\cos^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} \text{ /; } 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0678.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi i}{2} - i\cos^{-1}\left(\sqrt{z}\right) \text{ /; } \operatorname{Im}(z) < 0$$

01.28.27.0679.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i\cos^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} \text{ /; } (z \in \mathbb{R} \land z > 1)$$

01.28.27.0680.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}}\cos^{-1}\left(\sqrt{z}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\cos^{-1}\left(\sqrt{z}\right)$

01.28.27.0681.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = i\cos^{-1}\left(\sqrt{z}\right) \text{ /; } \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0682.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -i\cos^{-1}\left(\sqrt{z}\right) \text{ /; } \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0683.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -\pi i + i\cos^{-1}\left(\sqrt{z}\right) \text{ /; } (z \in \mathbb{R} \land z < 0)$$

01.28.27.0684.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right) + \frac{\sqrt{z-1}}{\sqrt{1-z}}\cos^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\cos^{-1}\left(\sqrt{z}\right)$

01.28.27.0685.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i\cos^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0686.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -i\cos^{-1}\left(\sqrt{z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.0687.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -\pi i + i\cos^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0688.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right)\frac{\pi i}{2} - \frac{\sqrt{-z}}{\sqrt{z}}\cos^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\cos^{-1}\left(\sqrt{z}\right)$

01.28.27.0689.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i\cos^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0690.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -i\cos^{-1}\left(\sqrt{z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.0691.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -\pi i + i\cos^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0692.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right) + \frac{\sqrt{z}}{\sqrt{-z}}\cos^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z+a}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$ and $\cos^{-1}(z)$

01.28.27.0693.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{i}{2}\cos^{-1}(z) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.0694.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = -\frac{i}{2}\cos^{-1}(z) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0695.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{i}{2}\cos^{-1}(z) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0696.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} - 1\right) - \frac{\sqrt{1-z}}{2\sqrt{z-1}}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$ and $\cos^{-1}(z)$

01.28.27.0697.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{i}{2}\cos^{-1}(z) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0698.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = -\frac{1}{2} i\cos^{-1}(z) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.0699.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = -\frac{1}{2} i\cos^{-1}(z) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0700.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{\sqrt{z-1}}{2\sqrt{1-z}}\cos^{-1}(z) - \frac{1}{2}\sqrt{z}\sqrt{-\frac{1}{z}}\,\pi$$

Involving $\coth^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-a-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$ and $\cos^{-1}(z)$

01.28.27.0701.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{i}{2}\cos^{-1}(z) /; \operatorname{Im}(z) > 0$$

01.28.27.0702.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{i}{2}\cos^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.0703.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{i}{2}\cos^{-1}(z) - \pi i \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0704.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{\pi i}{2}\left(1 - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right) - \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$ and $\cos^{-1}(z)$

01.28.27.0705.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2} i \cos^{-1}(z) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0706.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2} i \cos^{-1}(z) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.0707.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2} i \cos^{-1}(z) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0708.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{\sqrt{-z-1}}{2\sqrt{z+1}}\cos^{-1}(z) - \frac{\pi\sqrt{-z}\, z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-a}{z+a}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$ and $\cos^{-1}(z)$

01.28.27.0709.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{i}{2}\cos^{-1}(z) \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.0710.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{i}{2}\cos^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.0711.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{i}{2}\cos^{-1}(z) - \pi\, i\ /;\ (z \in \mathbb{R} \land z < -1)$$

01.28.27.0712.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \left(\sqrt{z+1}\ \sqrt{\frac{1}{z+1}} - 1\right)\frac{\pi\, i}{2} - \frac{\sqrt{-1-z}}{2\sqrt{z+1}}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$ and $\cos^{-1}(z)$

01.28.27.0713.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\, i\cos^{-1}(z) - \frac{\pi\, i}{2}\ /;\ 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0714.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{1}{2}\, i\cos^{-1}(z) + \frac{\pi\, i}{2}\ /;\ \mathrm{Im}(z) < 0$$

01.28.27.0715.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{1}{2}\, i\cos^{-1}(z) - \frac{\pi\, i}{2}\ /;\ (z \in \mathbb{R} \land z > 1)$$

01.28.27.0716.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{\sqrt{1-z}}{2\sqrt{z-1}}\cos^{-1}(z) - \frac{1}{2}\pi\sqrt{z}\ \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.28.27.0717.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi\, i}{2} - i\cos^{-1}\left(\frac{1}{z}\right)\ /;\ \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0718.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = i\cos^{-1}\left(\frac{1}{z}\right) - \frac{\pi\, i}{2}\ /;\ \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0719.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = i\cos^{-1}\left(\frac{1}{z}\right) - \frac{3\pi\, i}{2}\ /;\ (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0720.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -i\cos^{-1}\left(\frac{1}{z}\right) - \frac{\pi\, i}{2}\ /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0721.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -\frac{\sqrt{z^2}\,\sqrt{z^2-1}}{z\,\sqrt{1-z^2}}\cos^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}\left(\frac{\sqrt{z-1}}{\sqrt{1-z}} - \frac{\sqrt{z^2}\,\sqrt{-1+z^2}}{z\,\sqrt{1-z^2}} + \frac{\sqrt{-z-1}}{\sqrt{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.28.27.0722.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i\cos^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0723.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i\cos^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0724.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i\cos^{-1}\left(\frac{1}{z}\right) + \pi\, i /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0725.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i\cos^{-1}\left(\frac{1}{z}\right) - \pi\, i /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0726.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \left(\frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} + \frac{z\,\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\right)\frac{\pi}{2} - \frac{z\,\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\cos^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.28.27.0727.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i\cos^{-1}\left(\frac{1}{z}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0728.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i\cos^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0729.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i\cos^{-1}\left(\frac{1}{z}\right) + \pi\, i /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0730.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i\cos^{-1}\left(\frac{1}{z}\right) - \pi\, i /; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0731.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -\frac{\pi\sqrt{-z}}{2}\left(1 - \frac{\sqrt{z^2}}{z}\right)\sqrt{\frac{1}{z}} - z\sqrt{-\frac{1}{z^2}}\cos^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.28.27.0732.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -i\cos^{-1}\left(\frac{1}{z}\right) /; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.0733.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = i\cos^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0734.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\pi\, i + i\cos^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0735.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \pi\, i - i\cos^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.0736.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \frac{\pi}{2}\left(\sqrt{z^2} - z\right)\sqrt{-\frac{1}{z^2}} - \sqrt{z^2}\sqrt{-\frac{1}{z^2}}\cos^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$ and $\cos^{-1}(z)$

01.28.27.0737.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = i\cos^{-1}(z) \;/;\; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1) \bigvee (i\,z \in \mathbb{R} \land i\,z > 0)$$

01.28.27.0738.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -i\cos^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0739.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \pi\,i - i\cos^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0740.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\pi\,i + i\cos^{-1}(z) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0) \bigvee (i\,z \in \mathbb{R} \land i\,z < 0)$$

01.28.27.0741.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(\frac{\pi}{2}\left(\sqrt{\frac{1}{z^2}}\;z - 1\right) + \cos^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$ and $\cos^{-1}(z)$

01.28.27.0742.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = i\cos^{-1}(z) \;/;\; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0743.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -i\cos^{-1}(z) \;/;\; -\frac{\pi}{2} \le \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0744.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -\pi i + i\cos^{-1}(z) \;/;\; \frac{\pi}{2} \le \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0745.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \pi i - i\cos^{-1}(z) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0746.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(\frac{\pi}{2}\left(\sqrt{z^2}\sqrt{\frac{1}{z^2}} - \frac{\sqrt{z^2}}{z}\right) + \frac{\sqrt{z^2}}{z}\cos^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$ and $\cos^{-1}(z)$

01.28.27.0747.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i\cos^{-1}(z) \;/;\; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.0748.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -i\cos^{-1}(z) \;/;\; -\frac{\pi}{2} \le \arg(z) \le 0$$

01.28.27.0749.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -\pi i + i\cos^{-1}(z) \;/;\; \frac{\pi}{2} \le \arg(z) \le \pi$$

01.28.27.0750.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \pi i - i\cos^{-1}(z) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.0751.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{-z}}{\sqrt{z}} - \sqrt{-z^2}\sqrt{\frac{1}{z^2}}\right) - \frac{\sqrt{-z}}{\sqrt{z}}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$ and $\cos^{-1}(z)$

01.28.27.0752.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i\cos^{-1}(z) \;/;\; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.0753.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -i\cos^{-1}(z) \;/;\; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.28.27.0754.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -\pi i + i\cos^{-1}(z) \;/;\; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.0755.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \pi i - i\cos^{-1}(z) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.0756.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{-z^2}}{z} - \sqrt{-z^2}\sqrt{\frac{1}{z^2}}\right) - \frac{\sqrt{-z^2}}{z}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$ and $\cos^{-1}(z)$

01.28.27.0757.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i\cos^{-1}(z) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.0758.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi i}{2} - i\cos^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0759.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i\cos^{-1}(z) + \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0760.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i\cos^{-1}(z) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0012.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\frac{\pi}{2} - \cos^{-1}(z)\right) \;/;\; z \notin (-\infty, -1) \bigwedge z \notin (1, \infty)$$

01.28.27.0761.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{i\sqrt{1-z^2}}{\sqrt{z^2-1}} - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right) - \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$ and $\cos^{-1}(z)$

01.28.27.0762.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i\cos^{-1}(z) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0763.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi i}{2} - i\cos^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0764.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i\cos^{-1}(z) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0765.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -i\cos^{-1}(z) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0766.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - \frac{i\sqrt{z^2-z^4}}{z\sqrt{-1+z^2}} - 1\right)\frac{\pi i}{2} - \frac{\sqrt{z^2-z^4}}{z\sqrt{z^2-1}}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$ and $\cos^{-1}(z)$

01.28.27.0767.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i\cos^{-1}(z) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0768.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi i}{2} - i\cos^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0769.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i\cos^{-1}(z) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0770.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i\cos^{-1}(z) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0771.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right)\frac{\pi i}{2} - \frac{\sqrt{-z}}{\sqrt{z}}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$ and $\cos^{-1}(z)$

01.28.27.0772.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i\cos^{-1}(z) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0773.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi i}{2} - i\cos^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0774.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i\cos^{-1}(z) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0775.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -i\cos^{-1}(z) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0776.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} + \frac{i z\sqrt{-1+z^2}}{\sqrt{z^2-z^4}} - 1\right)\frac{\pi i}{2} + \frac{z\sqrt{-1+z^2}}{\sqrt{z^2-z^4}}\cos^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$ and $\cos^{-1}(i z)$

01.28.27.0777.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = \frac{i}{2}\cos^{-1}(i z) - \frac{\pi i}{4}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right)$ and $\cos^{-1}(i z)$

01.28.27.0778.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{3\pi i}{4} + \frac{1}{2} i\cos^{-1}(i z) \;/;\; 0 \leq \arg(z) < \pi$$

01.28.27.0779.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi i}{4} + \frac{1}{2} i\cos^{-1}(i z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0780.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi}{2}\left(\frac{i}{2} + \sqrt{-\frac{1}{z^2}}\, z\right) + \frac{1}{2} i\cos^{-1}(i z)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right)$ and $\cos^{-1}(i\,z)$

01.28.27.0781.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{3\pi i}{4} + \frac{1}{2} i \cos^{-1}(i\,z) \;/;\; 0 \le \arg(z) < \pi$$

01.28.27.0782.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{\pi i}{4} + \frac{1}{2} i \cos^{-1}(i\,z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0783.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{1}{2} i \cos^{-1}(i\,z) - \frac{1}{2}\pi\left(\frac{i}{2} + \sqrt{-\frac{1}{z^2}}\, z\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right)$ and $\cos^{-1}(i\,z)$

01.28.27.0784.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = \frac{i}{2}\cos^{-1}(i\,z) - \frac{\pi i}{4}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.28.27.0785.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{\pi i}{2} + 2\, i \cos^{-1}\left(\frac{1}{z}\right) \;/;\; 0 < \arg(z) \le \frac{\pi}{2}$$

01.28.27.0786.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{\pi i}{2} - 2\, i \cos^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0787.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{3\pi i}{2} + 2\, i \cos^{-1}\left(\frac{1}{z}\right) \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0788.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{3\pi i}{2} - 2\,i\cos^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \le -\frac{\pi}{2}$$

01.28.27.0789.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = i\pi\left(1 - \frac{i\sqrt{z^2}}{2\sqrt{-z^2}} - \sqrt{\frac{z^2}{z^2-1}}\sqrt{\frac{z^2-1}{z^2}} + \frac{i\,z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\right) + \frac{2\,z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\cos^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right)$ and $\cos^{-1}\left(\frac{1}{z}\right)$

01.28.27.0790.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = 2\,i\cos^{-1}\left(\frac{1}{z}\right) - \pi\,i /; |z| > \sqrt{2} \bigwedge 0 < \arg(z) \le \pi$$

01.28.27.0791.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = \pi\,i - 2\,i\cos^{-1}\left(\frac{1}{z}\right) /; |z| > \sqrt{2} \bigwedge -\pi < \arg(z) \le 0$$

01.28.27.0792.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\left(\theta\left(\left|\sqrt{z^2-1}\right|-1\right) + \frac{\sqrt{z^2}}{z} - 1\right)\pi - \frac{2\sqrt{z^2}}{z}\cos^{-1}\left(\frac{1}{z}\right)\right)$$

01.28.27.0793.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) =$$

$$-\frac{\pi}{2\sqrt{1-z^2}}\left(\left(z^2-2\right)\sqrt{\frac{z^4}{z^2-1}}\sqrt{\frac{z^2-1}{z^4}}\sqrt{\frac{z^2-1}{\left(z^2-2\right)^2}} - \sqrt{1-\frac{1}{z^2}}\,z\left(\sqrt{\frac{1}{z^2}}\,z - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + \sqrt{\frac{i}{z}}\sqrt{-i\,z} - \sqrt{-\frac{i}{z}}\sqrt{i\,z} + \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right)\right) - \frac{2\,z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\left(\frac{\pi}{2} - \cos^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{2\,z\sqrt{z^2-1}}{1-2\,z^2}\right)$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$ and $\cos^{-1}(z)$

01.28.27.0794.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} - 2i\cos^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1) \bigvee (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.0795.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{\pi i}{2} + 2i\cos^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.0796.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{3\pi i}{2} + 2i\cos^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.0797.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{3\pi i}{2} - 2i\cos^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0) \bigvee (i z \in \mathbb{R} \land i z < 0)$$

01.28.27.0798.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} + 2i\cos^{-1}(z) /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.0799.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{5\pi i}{2} + 2i\cos^{-1}(z) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0800.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) =$$

$$\frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\frac{\pi}{2}\left(-\sqrt{\frac{1}{1-z}}\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\sqrt{z+1} - \sqrt{-i z}\sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}}\sqrt{i z} + \frac{\sqrt{z^2}}{z} - 2\right) + 2\cos^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$ and $\cos^{-1}(z)$

01.28.27.0801.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = \pi i - 2 i \cos^{-1}(z) \,/;\, \frac{\pi}{4} \le \arg(z) \le \frac{\pi}{2} \bigvee -\frac{3\pi}{4} \le \arg(z) \le -\frac{\pi}{2}$$

01.28.27.0802.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\pi i + 2 i \cos^{-1}(z) \,/;\, \frac{\pi}{2} < \arg(z) \le \frac{3\pi}{4} \bigvee -\frac{\pi}{2} < \arg(z) \le -\frac{\pi}{4}$$

01.28.27.0803.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\Bigg(2\cos^{-1}(z) + \frac{\pi}{2}\left(\frac{\sqrt{z^2-1}\, z}{\sqrt{z^4-z^2}} + \sqrt{\frac{1}{z}}\sqrt{\frac{1}{\sqrt{2}\, z-1}}\sqrt{\sqrt{2}\, z-1}\sqrt{z} - \sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{-\sqrt{2}\, z-1}\sqrt{-\frac{1}{\sqrt{2}\, z+1}} + \frac{\sqrt{z^2}}{z} - 2\right)\Bigg)$$

Involving $\tan^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\tan^{-1}(i z)$

01.28.27.0804.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - i \tan^{-1}(i z) \,/;\, \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0805.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - i \tan^{-1}(i z) \,/;\, \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0806.01

$$\coth^{-1}(z) = -i \tan^{-1}(i z) + \frac{\pi\sqrt{-z^2}}{2z} \,/;\, z \notin (-1, 1)$$

01.28.27.0807.01

$$\coth^{-1}(z) = -i \tan^{-1}(i z) - \frac{\pi i}{2} \operatorname{sgn}(\operatorname{Im}(z)) \,/;\, \operatorname{Im}(z) \ne 0$$

01.28.27.0808.01

$$\coth^{-1}(z) = -i \tan^{-1}(i z) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}(z)$ and $\tan^{-1}(-i z)$

01.28.27.0809.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + i \tan^{-1}(-i z) \,/;\, \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0810.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + i \tan^{-1}(-i z) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0811.01

$$\coth^{-1}(z) = i \tan^{-1}(-i z) + \frac{\pi \sqrt{-z^2}}{2 z} /; z \notin (-1, 1)$$

01.28.27.0812.01

$$\coth^{-1}(z) = i \tan^{-1}(-i z) - \frac{\pi i}{2} \operatorname{sgn}(\operatorname{Im}(z)) /; \operatorname{Im}(z) \neq 0$$

01.28.27.0813.01

$$\coth^{-1}(z) = i \tan^{-1}(-i z) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} \sqrt{\frac{1}{1 - z^2}} \sqrt{1 - z^2}$$

Involving $\coth^{-1}(z)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0013.01

$$\coth^{-1}(z) = -i \tan^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\tan^{-1}\left(-\frac{i}{z}\right)$

01.28.27.0814.01

$$\coth^{-1}(z) = i \tan^{-1}\left(-\frac{i}{z}\right)$$

Involving $\coth^{-1}(i z)$

Involving $\coth^{-1}(i z)$ and $\tan^{-1}(z)$

01.28.27.0815.01

$$\coth^{-1}(i z) = -\frac{\pi i}{2} + i \tan^{-1}(z) /; \operatorname{Re}(z) > 0 \lor (z i \in \mathbb{R} \land z i < -1) \lor (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.0816.01

$$\coth^{-1}(i z) = \frac{\pi i}{2} + i \tan^{-1}(z) /; \operatorname{Re}(z) < 0 \lor (i z \in \mathbb{R} \land i z > 1) \lor (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.0817.01

$$\coth^{-1}(i z) = -\frac{\pi i \sqrt{z^2}}{2 z} + i \tan^{-1}(z) /; i z \notin (-1, 1)$$

01.28.27.0818.01

$$\coth^{-1}(i z) = i \tan^{-1}(z) - \frac{\pi i}{2} \operatorname{sgn}(\operatorname{Re}(z)) /; \operatorname{Re}(z) \neq 0$$

01.28.27.0819.01

$$\coth^{-1}(i\,z) = i\tan^{-1}(z) - \frac{\pi\,i\,z}{2}\sqrt{\frac{1}{z^2}}\sqrt{\frac{1}{z^2+1}}\sqrt{z^2+1}$$

Involving $\coth^{-1}(i\,z)$ and $\tan^{-1}\left(\frac{1}{z}\right)$

01.28.27.0820.01

$$\coth^{-1}(i\,z) = -i\tan^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$ and $\tan^{-1}(i\,z)$

01.28.27.0821.01

$$\coth^{-1}\left(\frac{1}{z}\right) = -i\tan^{-1}(i\,z)$$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0822.01

$$\coth^{-1}\left(\frac{1}{z}\right) = -\frac{\pi\,i}{2} - i\tan^{-1}\left(\frac{i}{z}\right) /;\ \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0) \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0823.01

$$\coth^{-1}\left(\frac{1}{z}\right) = \frac{\pi\,i}{2} - i\tan^{-1}\left(\frac{i}{z}\right) /;\ \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1) \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0824.01

$$\coth^{-1}\left(\frac{1}{z}\right) = -i\tan^{-1}\left(\frac{i}{z}\right) - \frac{\pi\sqrt{-z^2}}{2\,z}\sqrt{\frac{z^2}{z^2-1}}\sqrt{\frac{z^2-1}{z^2}}$$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$ and $\tan^{-1}\left(\sqrt{z}\right)$

01.28.27.0825.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \frac{\pi\,i}{2} - i\tan^{-1}\left(\sqrt{z}\right) /;\ \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0826.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\frac{\pi\,i}{2} + i\tan^{-1}\left(\sqrt{z}\right) /;\ -\pi < \arg(z) \le 0$$

01.28.27.0827.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\frac{\pi i}{2} - i \tan^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0828.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \frac{\sqrt{-z}}{\sqrt{z}} \tan^{-1}\left(\sqrt{z}\right) - \frac{\pi \sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$ and $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0829.01

$$\coth^{-1}\left(\sqrt{-z}\right) = i \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.0830.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -i \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.0831.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\frac{\sqrt{-z}}{\sqrt{z}} \tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$ and $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0832.01

$$\coth^{-1}\left(\sqrt{-z}\right) = i \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0833.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -i \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.0834.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\sqrt{-z} \sqrt{\frac{1}{z}} \tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$ and $\tan^{-1}\left(1 \Big/ \sqrt{\frac{1}{z}}\right)$

01.28.27.0835.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \frac{\pi i}{2} - i \tan^{-1}\left(1 \Big/ \sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0836.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\frac{\pi i}{2} + i \tan^{-1}\left(1 \Big/ \sqrt{\frac{1}{z}}\right) /; -\pi < \arg(z) \leq 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0837.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \frac{\pi i}{2} + i \tan^{-1}\left(1 \Big/ \sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0838.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \sqrt{-z} \sqrt{\frac{1}{z}} \tan^{-1}\left(1 \Big/ \sqrt{\frac{1}{z}}\right) - \frac{\pi \sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\tan^{-1}\left(\sqrt{z}\right)$

01.28.27.0839.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \tan^{-1}\left(\sqrt{z}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.0840.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \tan^{-1}\left(\sqrt{z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.0841.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\sqrt{-z^2}}{z} \tan^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0842.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\pi i}{2} + i \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0843.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi i}{2} - i \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.0844.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi i}{2} + i \tan^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0845.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi \sqrt{-z-1}}{2\sqrt{z+1}} - \frac{\sqrt{-z}}{\sqrt{z}} \tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0846.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\pi i}{2} + i \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0847.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi i}{2} - i \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; -\pi < \arg(z) \leq 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0848.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\pi i}{2} - i \tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0849.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi \sqrt{-z-1}}{2 \sqrt{z+1}} - \sqrt{-z} \sqrt{\frac{1}{z}} \tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\tan^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right)$

01.28.27.0850.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \tan^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.0851.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \tan^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.0852.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \sqrt{-z} \sqrt{\frac{1}{z}} \tan^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$ and $\tan^{-1}(i z)$

01.28.27.0853.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\pi i}{2} - i \tan^{-1}(i z) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0854.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi i}{2} - i \tan^{-1}(i z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0855.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi i}{2} + i \tan^{-1}(i z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0856.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\pi i}{2} + i \tan^{-1}(i z) \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0857.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi \sqrt{1 - z^2}}{2 \sqrt{z^2 - 1}} - \frac{i \sqrt{z^2}}{z} \tan^{-1}(i z)$$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0858.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -i \tan^{-1}\left(\frac{i}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0859.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = i \tan^{-1}\left(\frac{i}{z}\right) \;/;\; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.0860.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\sqrt{z^2}}{z} i \tan^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(a (b z^c)^m\right)$

Involving $\coth^{-1}(a (b z^c)^m)$ and $\tan^{-1}\left(\frac{i}{a} b^{-m} z^{-m c}\right)$

01.28.27.0861.01

$$\coth^{-1}(a (b z^c)^m) = -\frac{i b^m z^{m c}}{(b z^c)^m} \tan^{-1}\left(\frac{i}{a} b^{-m} z^{-m c}\right) \;/;\; 2 m \in \mathbb{Z}$$

Involving $\coth^{-1}\left(\frac{2 z}{1+z^2}\right)$

Involving $\coth^{-1}\left(\frac{2 z}{1+z^2}\right)$ and $\tan^{-1}(i z)$

01.28.27.0862.01

$$\coth^{-1}\left(\frac{2 z}{1 + z^2}\right) = -2 i \tan^{-1}(i z) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0863.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) = -2\,i\tan^{-1}(i\,z) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0864.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) = -2\,i\tan^{-1}(i\,z) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\frac{2z}{1+z^2}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0865.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) = -2\,i\tan^{-1}\left(\frac{i}{z}\right) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0866.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) = -2\,i\tan^{-1}\left(\frac{i}{z}\right) - \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0867.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) = -2\,i\tan^{-1}\left(\frac{i}{z}\right) + \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$ and $\tan^{-1}(i\,z)$

01.28.27.0868.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = -2\,i\,\tan^{-1}(i\,z) \;/;\; |z| < 1$$

01.28.27.0869.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = -2\,i\,\tan^{-1}(i\,z) - \pi\,i \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \le \pi$$

01.28.27.0870.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = -2\,i\,\tan^{-1}(i\,z) + \pi\,i \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \le 0$$

01.28.27.0871.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = -2\,i\,\tan^{-1}(i\,z) + \frac{\pi\sqrt{-z^2}}{z} \;/;\; |z| > 1$$

01.28.27.0872.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \frac{\pi\sqrt{-z^2}}{2z}\left(\frac{z+i}{z-i}\sqrt{\left(\frac{z-i}{z+i}\right)^2} + 1\right) - 2\,i\,\tan^{-1}(i\,z) \;/;\; |z| \ne 1$$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0873.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \pi i - 2 i \tan^{-1}\left(\frac{i}{z}\right) /; |z| < 1 \bigwedge 0 \leq \arg(z) < \pi$$

01.28.27.0874.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = -\pi i - 2 i \tan^{-1}\left(\frac{i}{z}\right) /; |z| < 1 \bigwedge -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0875.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \pi \sqrt{-\frac{1}{z^2}}\, z - 2 i \tan^{-1}\left(\frac{i}{z}\right) /; |z| < 1$$

01.28.27.0876.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = -2 i \tan^{-1}\left(\frac{i}{z}\right) /; |z| > 1$$

01.28.27.0877.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \frac{\pi}{2}\left(1 - \frac{z+i}{z-i}\sqrt{\left(\frac{z-i}{z+i}\right)^2}\right)\sqrt{-\frac{1}{z^2}}\, z - 2 i \tan^{-1}\left(\frac{i}{z}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$ and $\tan^{-1}\left(\sqrt{z}\right)$

01.28.27.0878.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2 i \tan^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq 0$$

01.28.27.0879.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2 i \tan^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0880.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2 i \tan^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0881.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = \frac{2\sqrt{-z}}{\sqrt{z}} \tan^{-1}\left(\sqrt{z}\right) - \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$ and $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0882.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0883.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.0884.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0885.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{z+1}}{2\sqrt{-z-1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$ and $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0886.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0$$

01.28.27.0887.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0888.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0889.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2\sqrt{-z}\sqrt{\frac{1}{z}}\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{z+1}}{2\sqrt{-z-1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$ and $\tan^{-1}\left(\sqrt{z}\right)$

01.28.27.0890.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\tan^{-1}\left(\sqrt{z}\right) + \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.0891.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\tan^{-1}\left(\sqrt{z}\right) - \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0892.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\tan^{-1}\left(\sqrt{z}\right) + \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0893.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\sqrt{z}\right) + \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$ and $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0894.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0895.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.0896.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0897.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\sqrt{z+1}}{2\sqrt{-z-1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$ and $\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0898.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0$$

01.28.27.0899.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0900.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0901.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\sqrt{-z}\sqrt{\frac{1}{z}}\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\sqrt{z+1}}{2\sqrt{-z-1}}$$

Involving $\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$ and $\tan^{-1}\left(\sqrt{z}\right)$

01.28.27.0902.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\sqrt{z}\right)\,/;\,|z|<1\bigwedge 0<\arg(z)\leq\pi$$

01.28.27.0903.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\sqrt{z}\right)\,/;\,|z|<1\bigwedge -\pi<\arg(z)\leq 0$$

01.28.27.0904.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\sqrt{z}\right)\,/;\,|z|<1$$

01.28.27.0905.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\sqrt{z}\right)-\pi\,i\,/;\,|z|>1\bigwedge -\pi<\arg(z)\leq 0$$

01.28.27.0906.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\sqrt{z}\right)+\pi\,i\,/;\,|z|>1\bigwedge 0<\arg(z)\leq\pi$$

01.28.27.0907.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\sqrt{z}\right)-\frac{\pi\sqrt{-z^2}}{z}\,/;\,|z|>1$$

01.28.27.0908.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{\pi\sqrt{z}}{2\sqrt{-z}}\left(\frac{z-1}{z+1}\sqrt{\left(\frac{1+z}{1-z}\right)^2}+1\right)+\frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\sqrt{z}\right)\,/;\,|z|\neq 1$$

Involving $\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$ and $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0909.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)-\pi\,i\,/;\,|z|<1\land \operatorname{Im}(z)>0$$

01.28.27.0910.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)+\pi\,i\,/;\,|z|<1\bigwedge -\pi<\arg(z)\leq 0$$

01.28.27.0911.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi\,i\;/;\;(z\in\mathbb{R}\land -1<z<0)$$

01.28.27.0912.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \pi\sqrt{-z}\sqrt{\frac{1}{z}} - \frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)\;/;\;|z|<1$$

01.28.27.0913.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)\;/;\;|z|>1\bigwedge 0<\arg(z)\leq\pi$$

01.28.27.0914.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)\;/;\;|z|>1\bigwedge -\pi<\arg(z)\leq 0$$

01.28.27.0915.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)\;/;\;|z|>1$$

01.28.27.0916.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{\pi\sqrt{-z}}{2}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}+1\right)\sqrt{\frac{1}{z}} - \frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)\;/;\;|z|\neq 1$$

Involving $\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$ and $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0917.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi\,i\;/;\;|z|<1\land \operatorname{Im}(z)>0$$

01.28.27.0918.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi\,i\;/;\;|z|<1\land \operatorname{Im}(z)\leq 0$$

01.28.27.0919.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \pi\sqrt{-z}\sqrt{\frac{1}{z}} - 2\sqrt{-z}\sqrt{\frac{1}{z}}\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)\;/;\;|z|<1$$

01.28.27.0920.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)\;/;\;|z|>1\land \operatorname{Im}(z)>0$$

01.28.27.0921.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right)\;/;\;|z|>1\land \operatorname{Im}(z)\leq 0$$

01.28.27.0922.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\sqrt{-z}\sqrt{\frac{1}{z}}\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z|>1$$

01.28.27.0923.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{\pi\sqrt{-z}}{2}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}+1\right)\sqrt{\frac{1}{z}} - 2\sqrt{-z}\sqrt{\frac{1}{z}}\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z|\neq 1$$

Involving $\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$ and $\tan^{-1}\left(\sqrt{z}\right)$

01.28.27.0924.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\sqrt{z}\right) /; |z|<1 \land 0<\arg(z)\leq\pi$$

01.28.27.0925.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\sqrt{z}\right) /; |z|<1 \land -\pi<\arg(z)\leq 0$$

01.28.27.0926.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\sqrt{z}\right) /; |z|<1$$

01.28.27.0927.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\sqrt{z}\right)+\pi\,i /; |z|>1 \land -\pi<\arg(z)\leq 0$$

01.28.27.0928.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\sqrt{z}\right)-\pi\,i /; |z|>1 \land 0<\arg(z)\leq\pi$$

01.28.27.0929.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\sqrt{z}\right)+\frac{\pi\sqrt{-z^2}}{z} /; |z|>1$$

01.28.27.0930.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{\pi\sqrt{z}}{2\sqrt{-z}}\left(\frac{z-1}{z+1}\sqrt{\left(\frac{1+z}{1-z}\right)^2}+1\right)-\frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\sqrt{z}\right) /; |z|\neq 1$$

Involving $\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$ and $\tan^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.0931.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi\,i \;/;\; |z| < 1 \land \operatorname{Im}(z) > 0$$

01.28.27.0932.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi\,i \;/;\; |z| < 1 \bigwedge -\pi < \arg(z) \le 0$$

01.28.27.0933.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi\,i \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0934.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\pi\sqrt{-z}\sqrt{\frac{1}{z}} + \frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| < 1$$

01.28.27.0935.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \le \pi$$

01.28.27.0936.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \le 0$$

01.28.27.0937.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| > 1$$

01.28.27.0938.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{\pi\sqrt{-z}}{2}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right)\sqrt{\frac{1}{z}} + \frac{2\sqrt{-z}}{\sqrt{z}}\tan^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| \ne 1$$

Involving $\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$ and $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.0939.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi\,i \;/;\; |z| < 1 \land \operatorname{Im}(z) > 0$$

01.28.27.0940.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi\,i \;/;\; |z| < 1 \land \operatorname{Im}(z) \le 0$$

01.28.27.0941.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\pi\sqrt{-z}\sqrt{\frac{1}{z}} + 2\sqrt{-z}\sqrt{\frac{1}{z}}\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; |z| < 1$$

01.28.27.0942.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z| > 1 \land \operatorname{Im}(z) > 0$$

01.28.27.0943.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z| > 1 \land \operatorname{Im}(z) \le 0$$

01.28.27.0944.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\sqrt{-z}\sqrt{\frac{1}{z}}\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z| > 1$$

01.28.27.0945.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{\pi\sqrt{-z}}{2}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}+1\right)\sqrt{\frac{1}{z}} + 2\sqrt{-z}\sqrt{\frac{1}{z}}\tan^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |z| \ne 1$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}+c\,z\right)$

Involving $\coth^{-1}\left(\sqrt{z^2-1}+z\right)$ and $\tan^{-1}(i\,z)$

01.28.27.0946.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{i}{2}\tan^{-1}(i\,z) - \frac{\pi\,i}{4} /; 0 < \arg(z) \le \frac{\pi}{2} \lor -\pi < \arg(z) \le -\frac{\pi}{2} \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.0947.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{i}{2}\tan^{-1}(i\,z) + \frac{\pi\,i}{4} /; \frac{\pi}{2} < \arg(z) < \pi \lor -\frac{\pi}{2} < \arg(z) < 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.0948.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{i}{2}\tan^{-1}(i\,z) - \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}+z\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0949.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.28.27.0950.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = \frac{\pi\,i}{2} - \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.0951.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{\pi\,i}{2} - \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; -\pi < \arg(z) \le -\frac{\pi}{2} \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0952.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{\pi\sqrt{-z-1}\left(z-\sqrt{z^2}\right)}{4\sqrt{z+1}\,z} - \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}-z\right)$ and $\tan^{-1}(i\,z)$

01.28.27.0953.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = \frac{i}{2}\tan^{-1}(i\,z) - \frac{\pi i}{4} \;/;\; 0<\arg(z)\le\frac{\pi}{2} \bigvee -\pi<\arg(z)\le-\frac{\pi}{2} \bigvee (z\in\mathbb{R}\land -1<z<1)$$

01.28.27.0954.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = \frac{i}{2}\tan^{-1}(i\,z) + \frac{\pi i}{4} \;/;\; \frac{\pi}{2}<\arg(z)<\pi \bigvee -\frac{\pi}{2}<\arg(z)<0 \bigvee (z\in\mathbb{R}\land z<-1) \bigvee (z\in\mathbb{R}\land z>1)$$

01.28.27.0955.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = \frac{i}{2}\tan^{-1}(i\,z) - \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}-z\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0956.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{\pi i}{2} + \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) \;/;\; 0<\arg(z)\le\frac{\pi}{2} \bigvee (z\in\mathbb{R}\land 0<z<1)$$

01.28.27.0957.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) \;/;\; \frac{\pi}{2}<\arg(z)\le\pi \bigvee -\pi<\arg(z)\le-\frac{\pi}{2}$$

01.28.27.0958.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = \frac{\pi i}{2} + \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) \;/;\; -\frac{\pi}{2}<\arg(z)<0 \bigvee (z\in\mathbb{R}\land z>1)$$

01.28.27.0959.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{\pi\sqrt{z-1}}{4\sqrt{1-z}\,z}\left(z+\sqrt{z^2}\right) + \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+c\,z}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)$ and $\tan^{-1}(i\,z)$

01.28.27.0960.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = -\frac{i}{2}\tan^{-1}(i\,z) + \frac{\pi i}{4} \;/;\; 0<\arg(z)\le\frac{\pi}{2} \bigvee -\pi<\arg(z)\le-\frac{\pi}{2} \bigvee (z\in\mathbb{R}\land -1<z<1)$$

01.28.27.0961.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = -\frac{i}{2}\tan^{-1}(i z) - \frac{\pi i}{4} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0962.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = -\frac{i}{2}\tan^{-1}(i z) + \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0963.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{\pi i}{2} - \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0964.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = -\frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.0965.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = -\frac{\pi i}{2} - \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0966.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{\pi\sqrt{z-1}}{4\sqrt{1-z}\, z}\left(z+\sqrt{z^2}\right) - \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right)$ and $\tan^{-1}(i z)$

01.28.27.0967.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{i}{2}\tan^{-1}(i z) + \frac{\pi i}{4} /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.0968.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{i}{2}\tan^{-1}(i z) - \frac{\pi i}{4} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.0969.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{i}{2}\tan^{-1}(i z) + \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0970.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.0971.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{\pi i}{2} + \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.0972.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{\pi i}{2} + \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0973.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{\pi\sqrt{-z-1}\left(z-\sqrt{z^2}\right)}{4\sqrt{z+1}\,z} + \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right)$ and $\tan^{-1}(i z)$

01.28.27.0974.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = -\frac{i}{2}\tan^{-1}(i z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0975.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = -\frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0976.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = -\frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0977.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = -\frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) + \frac{\pi z\sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right)$ and $\tan^{-1}(i z)$

01.28.27.0978.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = \frac{\pi i}{2} + \frac{i}{2}\tan^{-1}(i z) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0979.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{\pi i}{2} + \frac{i}{2}\tan^{-1}(i z) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0980.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = \frac{i}{2}\tan^{-1}(i z) + \frac{\pi z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0981.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0982.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0983.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) + \frac{\pi z\sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right)$ and $\tan^{-1}(i z)$

01.28.27.0984.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = -\frac{\pi i}{2} - \frac{i}{2}\tan^{-1}(i z) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0985.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = \frac{\pi i}{2} - \frac{i}{2}\tan^{-1}(i z) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0986.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = -\frac{i}{2}\tan^{-1}(i z) - \frac{\pi z \sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0987.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = -\frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0988.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = -\frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0989.01

$$\coth^{-1}\left(\frac{z}{1+\sqrt{1-z^2}}\right) = -\frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) - \frac{\pi z \sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right)$ and $\tan^{-1}(i z)$

01.28.27.0990.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = \frac{i}{2}\tan^{-1}(i z)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right)$ and $\tan^{-1}\left(\frac{i}{z}\right)$

01.28.27.0991.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0992.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0993.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = \frac{i}{2}\tan^{-1}\left(\frac{i}{z}\right) - \frac{\pi z\sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\cot^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\cot^{-1}(i z)$

01.28.27.0014.01

$$\coth^{-1}(z) = i\cot^{-1}(i z)$$

Involving $\coth^{-1}(z)$ and $\cot^{-1}(-i z)$

01.28.27.0994.01

$$\coth^{-1}(z) = -i\cot^{-1}(-i z)$$

Involving $\coth^{-1}(z)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.0995.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + i\cot^{-1}\left(\frac{i}{z}\right) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0996.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + i\cot^{-1}\left(\frac{i}{z}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0997.01

$$\coth^{-1}(z) = i\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi\sqrt{-z^2}}{2z} \;/;\; z \notin (-1, 1)$$

01.28.27.0998.01

$$\coth^{-1}(z) = i\cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{2}\operatorname{sgn}(\operatorname{Im}(z)) \;/;\; \operatorname{Im}(z) \neq 0$$

01.28.27.0999.01

$$\coth^{-1}(z) = i\cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}(z)$ and $\cot^{-1}\left(-\frac{i}{z}\right)$

01.28.27.1000.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - i \cot^{-1}\left(-\frac{i}{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1001.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - i \cot^{-1}\left(-\frac{i}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1002.01

$$\coth^{-1}(z) = -i \cot^{-1}\left(-\frac{i}{z}\right) + \frac{\pi \sqrt{-z^2}}{2 z} /; z \notin (-1, 1)$$

01.28.27.1003.01

$$\coth^{-1}(z) = -i \cot^{-1}\left(-\frac{i}{z}\right) - \frac{\pi i}{2} \operatorname{sgn}(\operatorname{Im}(z)) /; \operatorname{Im}(z) \neq 0$$

01.28.27.1004.01

$$\coth^{-1}(z) = -i \cot^{-1}\left(-\frac{i}{z}\right) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} \sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2}$$

Involving $\coth^{-1}(i z)$

Involving $\coth^{-1}(i z)$ and $\cot^{-1}(z)$

01.28.27.0015.01

$$\coth^{-1}(i z) = -i \cot^{-1}(z)$$

Involving $\coth^{-1}(i z)$ and $\cot^{-1}\left(\frac{1}{z}\right)$

01.28.27.1005.01

$$\coth^{-1}(i z) = -\frac{\pi i}{2} + i \cot^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0 \lor (i z \in \mathbb{R} \land i z < -1) \lor (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.1006.01

$$\coth^{-1}(i z) = \frac{\pi i}{2} + i \cot^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) < 0 \lor (i z \in \mathbb{R} \land i z > 1) \lor (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.1007.01

$$\coth^{-1}(i z) = -\frac{\pi i \sqrt{z^2}}{2 z} + i \cot^{-1}\left(\frac{1}{z}\right) /; i z \notin (-1, 1)$$

01.28.27.1008.01

$$\coth^{-1}(i z) = i \cot^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \operatorname{sgn}(\operatorname{Re}(z)) /; \operatorname{Re}(z) \neq 0$$

01.28.27.1009.01

$$\coth^{-1}(i z) = i \cot^{-1}\left(\frac{1}{z}\right) - \frac{\pi i z}{2} \sqrt{\frac{1}{z^2}} \sqrt{\frac{1}{z^2+1}} \sqrt{z^2+1}$$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$ and $\cot^{-1}(i z)$

01.28.27.1010.01

$$\coth^{-1}\left(\frac{1}{z}\right) = -\frac{\pi i}{2} + i \cot^{-1}(i z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0) \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1011.01

$$\coth^{-1}\left(\frac{1}{z}\right) = \frac{\pi i}{2} + i \cot^{-1}(i z) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1) \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1012.01

$$\coth^{-1}\left(\frac{1}{z}\right) = i \cot^{-1}(i z) - \frac{\pi \sqrt{-z^2}}{2 z} \sqrt{\frac{z^2}{z^2 - 1}} \sqrt{\frac{z^2 - 1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1013.01

$$\coth^{-1}\left(\frac{1}{z}\right) = i \cot^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$ and $\cot^{-1}\left(\sqrt{z}\right)$

01.28.27.1014.01

$$\coth^{-1}\left(\sqrt{-z}\right) = i \cot^{-1}\left(\sqrt{z}\right) \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.1015.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -i \cot^{-1}\left(\sqrt{z}\right) \;/;\; -\pi < \arg(z) \le 0$$

01.28.27.0016.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\frac{\sqrt{-z^2}}{z} \cot^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1016.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \frac{\pi i}{2} - i \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1017.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\frac{\pi i}{2} + i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1018.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\frac{\pi i}{2} - i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1019.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \frac{\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$ and $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1020.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \frac{\pi i}{2} - i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1021.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\frac{\pi i}{2} + i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; -\pi < \arg(z) \leq 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1022.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \frac{\pi i}{2} + i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1023.01

$$\coth^{-1}\left(\sqrt{-z}\right) = \sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\sqrt{-z}\right)$ and $\cot^{-1}\left(1\big/\sqrt{\frac{1}{z}}\right)$

01.28.27.1024.01

$$\coth^{-1}\left(\sqrt{-z}\right) = i\cot^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1025.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -i\cot^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.1026.01

$$\coth^{-1}\left(\sqrt{-z}\right) = -\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\cot^{-1}\left(\sqrt{z}\right)$

01.28.27.1027.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\pi i}{2} + i \cot^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1028.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi i}{2} - i \cot^{-1}\left(\sqrt{z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1029.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi i}{2} + i \cot^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1030.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi \sqrt{-z-1}}{2 \sqrt{z+1}} - \frac{\sqrt{-z}}{\sqrt{z}} \cot^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1031.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.1032.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \cot^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1033.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\sqrt{-z^2}}{z} \cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1034.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -i \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1035.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = i \cot^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.1036.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \sqrt{-z}\,\sqrt{\frac{1}{z}}\,\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right)$ and $\cot^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right)$

01.28.27.1037.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\pi i}{2} + i\cot^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1038.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi i}{2} - i\cot^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; -\pi < \arg(z) \leq 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1039.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = -\frac{\pi i}{2} - i\cot^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1040.01

$$\coth^{-1}\left(\frac{1}{\sqrt{-z}}\right) = \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}} - \sqrt{-z}\,\sqrt{\frac{1}{z}}\,\cot^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$ and $\cot^{-1}(i z)$

01.28.27.1041.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = i\,\cot^{-1}(i z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1042.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -i\,\cot^{-1}(i z) /; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.1043.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z}\, i\,\cot^{-1}(i z)$$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1044.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\pi i}{2} + i\cot^{-1}\left(\frac{i}{z}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1045.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi i}{2} + i \cot^{-1}\left(\frac{i}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.1046.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi i}{2} - i \cot^{-1}\left(\frac{i}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \wedge z < -1)$$

01.28.27.1047.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\pi i}{2} - i \cot^{-1}\left(\frac{i}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.28.27.1048.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{i \sqrt{z^2}}{z} \cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi \sqrt{1-z^2}}{2 \sqrt{z^2-1}}$$

Involving $\coth^{-1}\left(a \left(b z^c\right)^m\right)$

Involving $\coth^{-1}(a (b z^c)^m)$ and $\cot^{-1}(i\, a\, b^m z^{m c})$

01.28.27.1049.01

$$\coth^{-1}(a (b z^c)^m) = \frac{i (b z^c)^m}{b^m z^{m c}} \cot^{-1}(i\, a\, b^m z^{m c}) /; 2 m \in \mathbb{Z}$$

Involving $\coth^{-1}\left(\frac{2 z}{1+z^2}\right)$

Involving $\coth^{-1}\left(\frac{2 z}{1+z^2}\right)$ and $\cot^{-1}(i z)$

01.28.27.1050.01

$$\coth^{-1}\left(\frac{2 z}{1+z^2}\right) = 2 i \cot^{-1}(i z) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1) \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.1051.01

$$\coth^{-1}\left(\frac{2 z}{1+z^2}\right) = 2 i \cot^{-1}(i z) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1) \vee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.28.27.1052.01

$$\coth^{-1}\left(\frac{2 z}{1+z^2}\right) = 2 i \cot^{-1}(i z) + \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} \sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\frac{2 z}{1+z^2}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1053.01

$$\coth^{-1}\left(\frac{2 z}{1+z^2}\right) = 2 i \cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge z < -1) \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.1054.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) = 2\,i\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1055.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) = 2\,i\cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$ and $\cot^{-1}(i\,z)$

01.28.27.1056.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \pi\,i + 2\,i\cot^{-1}(i\,z) \;/;\; |z| < 1 \land 0 \le \arg(z) < \pi$$

01.28.27.1057.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = -\pi\,i + 2\,i\cot^{-1}(i\,z) \;/;\; |z| < 1 \land -\pi < \arg(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1058.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \pi\sqrt{-\frac{1}{z^2}}\,z + 2\,i\cot^{-1}(i\,z) \;/;\; |z| < 1$$

01.28.27.1059.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\,i\cot^{-1}(i\,z) \;/;\; |z| > 1$$

01.28.27.1060.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \frac{\pi}{2}\left(1 - \frac{z+i}{z-i}\sqrt{\left(\frac{z-i}{z+i}\right)^2}\right)\sqrt{-\frac{1}{z^2}}\,z + 2\,i\cot^{-1}(i\,z) \;/;\; |z| \ne 1$$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1061.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\,i\,\cot^{-1}\left(\frac{i}{z}\right) \;/;\; |z| < 1$$

01.28.27.1062.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\,i\,\cot^{-1}\left(\frac{i}{z}\right) - \pi\,i \;/;\; |z| > 1 \land 0 < \arg(z) \le \pi$$

01.28.27.1063.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\,i\,\cot^{-1}\left(\frac{i}{z}\right) + \pi\,i \;/;\; |z| > 1 \land -\pi < \arg(z) \le 0$$

01.28.27.1064.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\,i\,\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi\sqrt{-z^2}}{z} \;/;\; |z| > 1$$

01.28.27.1065.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \frac{\pi\sqrt{-z^2}}{2z}\left(\frac{z+i}{z-i}\sqrt{\left(\frac{z-i}{z+i}\right)^2} + 1\right) + 2\,i\,\cot^{-1}\left(\frac{i}{z}\right) \;/;\; |z| \neq 1$$

Involving $\tanh^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$ and $\cot^{-1}\left(\sqrt{z}\right)$

01.28.27.1066.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\,i\cot^{-1}\left(\sqrt{z}\right) - \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1067.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2\,i\,\cot^{-1}\left(\sqrt{z}\right) + \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.1068.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\,i\cot^{-1}\left(\sqrt{z}\right) + \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1069.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\sqrt{z}\right) - \frac{\pi\sqrt{z+1}}{2\sqrt{-z-1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1070.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.1071.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1072.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1073.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$ and $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1074.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1075.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = -2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.1076.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1077.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) = 2\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$ and $\cot^{-1}\left(\sqrt{z}\right)$

01.28.27.1078.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\cot^{-1}\left(\sqrt{z}\right) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1079.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\cot^{-1}\left(\sqrt{z}\right) - \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.1080.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\cot^{-1}\left(\sqrt{z}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1081.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\sqrt{z}\right) + \frac{\pi\sqrt{z+1}}{2\sqrt{-z-1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1082.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.1083.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1084.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1085.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$ and $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1086.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = 2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.1087.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.1088.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1089.01

$$\coth^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) = -2\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$ and $\cot^{-1}\left(\sqrt{z}\right)$

01.28.27.1090.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{z}\right) - \pi\,i\;/;\;|z|<1\land \operatorname{Im}(z)>0$$

01.28.27.1091.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{z}\right) + \pi\,i\;/;\;|z|<1\bigwedge -\pi<\arg(z)\le 0$$

01.28.27.1092.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{z}\right) + \pi\,i\;/;\;(z\in\mathbb{R}\land -1<z<0)$$

01.28.27.1093.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \pi\sqrt{-z}\sqrt{\frac{1}{z}} - \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\sqrt{z}\right)\;/;\;|z|<1$$

01.28.27.1094.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{z}\right)\;/;\;|z|>1\bigwedge 0<\arg(z)\le\pi$$

01.28.27.1095.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{z}\right)\;/;\;|z|>1\bigwedge -\pi<\arg(z)\le 0$$

01.28.27.1096.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\sqrt{z}\right)\;/;\;|z|>1$$

01.28.27.1097.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{\pi\sqrt{-z}}{2}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}+1\right)\sqrt{\frac{1}{z}} - \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\sqrt{z}\right)\;/;\;|z|\ne 1$$

Involving $\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1098.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)\;/;\;|z|<1\bigwedge 0<\arg(z)\le\pi$$

01.28.27.1099.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)\;/;\;|z|<1\bigwedge -\pi<\arg(z)\le 0$$

01.28.27.1100.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)\;/;\;|z|<1$$

01.28.27.1101.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi\,i\;/;\;|z|>1\bigwedge -\pi<\arg(z)\le 0$$

01.28.27.1102.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi\,i \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1103.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{-z^2}}{z} \;/;\; |z| > 1$$

01.28.27.1104.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{\pi\sqrt{z}}{2\sqrt{-z}}\left(\frac{z-1}{z+1}\sqrt{\left(\frac{1+z}{1-z}\right)^2} + 1\right) + \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$ and $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1105.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; |z| < 1 \land \operatorname{Im}(z) > 0$$

01.28.27.1106.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; |z| < 1 \land \operatorname{Im}(z) \leq 0$$

01.28.27.1107.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; |z| < 1$$

01.28.27.1108.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi\,i \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1109.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi\,i \;/;\; |z| > 1 \land \operatorname{Im}(z) > 0$$

01.28.27.1110.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = 2\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{-z^2}}{z} \;/;\; |z| > 1$$

01.28.27.1111.01

$$\coth^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) = \frac{\pi\sqrt{z}}{2\sqrt{-z}}\left(\frac{z-1}{z+1}\sqrt{\left(\frac{1+z}{1-z}\right)^2} + 1\right) + 2\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$ and $\cot^{-1}\left(\sqrt{z}\right)$

01.28.27.1112.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{z}\right) + \pi\,i \;/;\; |z| < 1 \land \operatorname{Im}(z) > 0$$

01.28.27.1113.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{z}\right) - \pi\,i \;/;\; |z| < 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1114.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{z}\right) - \pi\,i \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1115.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\pi\sqrt{-z}\,\sqrt{\frac{1}{z}} + \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\sqrt{z}\right) \;/;\; |z| < 1$$

01.28.27.1116.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{z}\right) \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1117.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{z}\right) \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1118.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\sqrt{z}\right) \;/;\; |z| > 1$$

01.28.27.1119.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{\pi\sqrt{-z}}{2}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right)\sqrt{\frac{1}{z}} + \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\sqrt{z}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$ and $\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1120.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1121.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| < 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1122.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; |z| < 1$$

01.28.27.1123.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi\,i\ /;\ |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1124.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi\,i\ /;\ |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1125.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\sqrt{-z^2}}{z}\ /;\ |z| > 1$$

01.28.27.1126.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{\pi\sqrt{z}}{2\sqrt{-z}}\left(\frac{z-1}{z+1}\sqrt{\left(\frac{1+z}{1-z}\right)^2} + 1\right) - \frac{2\sqrt{-z}}{\sqrt{z}}\cot^{-1}\left(\frac{1}{\sqrt{z}}\right)\ /;\ |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$ and $\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1127.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)\ /;\ |z| < 1 \land \operatorname{Im}(z) > 0$$

01.28.27.1128.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)\ /;\ |z| < 1 \land \operatorname{Im}(z) \leq 0$$

01.28.27.1129.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)\ /;\ |z| < 1$$

01.28.27.1130.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi\,i\ /;\ |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1131.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = 2\,i\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi\,i\ /;\ |z| > 1 \land \operatorname{Im}(z) > 0$$

01.28.27.1132.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -2\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\sqrt{-z^2}}{z}\ /;\ |z| > 1$$

01.28.27.1133.01

$$\coth^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) = -\frac{\pi\sqrt{z}}{2\sqrt{-z}}\left(\frac{z-1}{z+1}\sqrt{\left(\frac{1+z}{1-z}\right)^2} + 1\right) - 2\sqrt{-z}\sqrt{\frac{1}{z}}\cot^{-1}\left(\sqrt{\frac{1}{z}}\right)\ /;\ |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}+c\,z\right)$

Involving $\coth^{-1}\left(\sqrt{z^2-1}+z\right)$ and $\cot^{-1}(i\,z)$

01.28.27.1134.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right)=\frac{i}{2}\cot^{-1}(i\,z)\;/;\;-\frac{\pi}{2}<\arg(z)\leq\frac{\pi}{2}$$

01.28.27.1135.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right)=\frac{\pi\,i}{2}+\frac{i}{2}\cot^{-1}(i\,z)\;/;\;\frac{\pi}{2}<\arg(z)<\pi\bigvee(z\in\mathbb{R}\land z<-1)$$

01.28.27.1136.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right)=-\frac{\pi\,i}{2}+\frac{i}{2}\cot^{-1}(i\,z)\;/;\;-\pi<\arg(z)\leq-\frac{\pi}{2}\bigvee(z\in\mathbb{R}\land -1<z<0)$$

01.28.27.1137.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right)=-\frac{\pi\sqrt{-z-1}\left(z-\sqrt{z^2}\right)}{4\sqrt{z+1}\;z}+\frac{i}{2}\cot^{-1}(i\,z)$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}+z\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1138.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right)=\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right)-\frac{\pi\,i}{4}\;/;\;0<\arg(z)\leq\frac{\pi}{2}\bigvee-\pi<\arg(z)\leq-\frac{\pi}{2}\bigvee(z\in\mathbb{R}\land -1<z<1)$$

01.28.27.1139.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right)=\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right)+\frac{\pi\,i}{4}\;/;\;\frac{\pi}{2}<\arg(z)<\pi\bigvee-\frac{\pi}{2}<\arg(z)<0\bigvee(z\in\mathbb{R}\land z<-1)\bigvee(z\in\mathbb{R}\land z>1)$$

01.28.27.1140.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right)=\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right)-\frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}-z\right)$ and $\cot^{-1}(i\,z)$

01.28.27.1141.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right)=-\frac{\pi\,i}{2}-\frac{i}{2}\cot^{-1}(i\,z)\;/;\;0<\arg(z)\leq\frac{\pi}{2}\bigvee(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.1142.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right)=-\frac{i}{2}\cot^{-1}(i\,z)\;/;\;\frac{\pi}{2}<\arg(z)\leq\pi\bigvee-\pi<\arg(z)\leq-\frac{\pi}{2}$$

01.28.27.1143.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = \frac{\pi i}{2} - \frac{i}{2}\cot^{-1}(i z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.1144.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{\pi\sqrt{z-1}}{4\sqrt{1-z}\,z}\left(z+\sqrt{z^2}\right) - \frac{i}{2}\cot^{-1}(i z)$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}-z\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1145.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \frac{\pi}{2} \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 1)$$

01.28.27.1146.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z < -1) \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.1147.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+c z}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)$ and $\cot^{-1}(i z)$

01.28.27.1148.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{\pi i}{2} + \frac{i}{2}\cot^{-1}(i z) \;/;\; 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.1149.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{i}{2}\cot^{-1}(i z) \;/;\; \frac{\pi}{2} < \arg(z) \le \pi \bigvee -\pi < \arg(z) \le -\frac{\pi}{2}$$

01.28.27.1150.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = -\frac{\pi i}{2} + \frac{i}{2}\cot^{-1}(i z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.1151.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{\pi\sqrt{z-1}}{4\sqrt{1-z}\,z}\left(z+\sqrt{z^2}\right) + \frac{i}{2}\cot^{-1}(i z)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1152.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \frac{\pi}{2} \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.1153.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1154.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right)$ and $\cot^{-1}(i\,z)$

01.28.27.1155.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{i}{2}\cot^{-1}(i\,z) \;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.28.27.1156.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{\pi i}{2} - \frac{i}{2}\cot^{-1}(i\,z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1157.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{\pi i}{2} - \frac{i}{2}\cot^{-1}(i\,z) \;/;\; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1158.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{\pi\sqrt{-z-1}\left(z-\sqrt{z^2}\right)}{4\sqrt{z+1}\;z} - \frac{i}{2}\cot^{-1}(i\,z)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1159.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \frac{\pi}{2} \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.1160.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1161.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right)$ and $\cot^{-1}(i z)$

01.28.27.1162.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{i}{2}\cot^{-1}(i z) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1163.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{i}{2}\cot^{-1}(i z) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1164.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{i}{2}\cot^{-1}(i z) + \frac{\pi z\sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1165.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right)$ and $\cot^{-1}(i z)$

01.28.27.1166.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{i}{2}\cot^{-1}(i z) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1167.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{i}{2}\cot^{-1}(i\,z) - \frac{\pi\,i}{4} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1168.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{i}{2}\cot^{-1}(i\,z) + \frac{\pi\,z\,\sqrt{z^2-1}}{4\,\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1169.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = \frac{\pi\,i}{2} - \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1170.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{\pi\,i}{2} - \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1171.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) + \frac{\pi\,z\,\sqrt{z^2-1}}{2\,\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right)$ and $\cot^{-1}(i\,z)$

01.28.27.1172.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{i}{2}\cot^{-1}(i\,z) - \frac{\pi\,i}{4} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1173.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{i}{2}\cot^{-1}(i\,z) + \frac{\pi\,i}{4} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1174.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{i}{2}\cot^{-1}(i\,z) - \frac{\pi\,z\,\sqrt{z^2-1}}{4\,\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1175.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = -\frac{\pi i}{2} + \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1176.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{\pi i}{2} + \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1177.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right) - \frac{\pi z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right)$ and $\cot^{-1}(i z)$

01.28.27.1178.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{i}{2}\cot^{-1}(i z) - \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1179.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{i}{2}\cot^{-1}(i z) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1180.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{i}{2}\cot^{-1}(i z) - \frac{\pi z\sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right)$ and $\cot^{-1}\left(\frac{i}{z}\right)$

01.28.27.1181.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{i}{2}\cot^{-1}\left(\frac{i}{z}\right)$$

Involving $\csc^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\frac{1-z^2}{1+z^2}\right)$

01.28.27.1182.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} - \frac{1}{2} i \csc^{-1}\left(\frac{1-z^2}{1+z^2}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1183.01

$$\coth^{-1}(z) = \frac{\pi i}{4} + \frac{1}{2} i \csc^{-1}\left(\frac{1-z^2}{1+z^2}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1184.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} + \frac{1}{2} i \csc^{-1}\left(\frac{1-z^2}{1+z^2}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1185.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} - \frac{1}{2} i \csc^{-1}\left(\frac{1-z^2}{1+z^2}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1186.01

$$\coth^{-1}(z) = \frac{\pi i}{4}\left(i \sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}}\right) + \frac{\sqrt{-z^2}\, \sqrt{1-z^2}}{2z} \sqrt{\frac{1}{1-z^2}} \csc^{-1}\left(\frac{1-z^2}{1+z^2}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\frac{z^2-1}{z^2+1}\right)$

01.28.27.1187.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} + \frac{1}{2} i \csc^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1188.01

$$\coth^{-1}(z) = \frac{\pi i}{4} - \frac{1}{2} i \csc^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1189.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} - \frac{1}{2} i \csc^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1190.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} + \frac{1}{2} i \csc^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1191.01

$$\coth^{-1}(z) = \frac{\pi i}{4}\left(i \sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}}\right) - \frac{\sqrt{-z^2}\, \sqrt{1-z^2}}{2z} \sqrt{\frac{1}{1-z^2}} \csc^{-1}\left(\frac{z^2-1}{z^2+1}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{1-z^2}\right)$

01.28.27.1192.01

$$\coth^{-1}(z) = -i \csc^{-1}\left(\sqrt{1-z^2}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1193.01

$$\coth^{-1}(z) = i \csc^{-1}\left(\sqrt{1-z^2}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1194.01

$$\coth^{-1}(z) = \pi i - i \csc^{-1}\left(\sqrt{1-z^2}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1195.01

$$\coth^{-1}(z) = -\pi i + i \csc^{-1}\left(\sqrt{1-z^2}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1196.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}}\right) + \frac{\sqrt{-z^2}}{z} \csc^{-1}\left(\sqrt{1-z^2}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

01.28.27.1197.01

$$\coth^{-1}(z) = -i \csc^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1198.01

$$\coth^{-1}(z) = i \csc^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) - \frac{\pi i}{2} /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1199.01

$$\coth^{-1}(z) = -i \csc^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1200.01

$$\coth^{-1}(z) = i \csc^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1201.01

$$\coth^{-1}(z) = \sqrt{z^2} \sqrt{-\frac{1}{z^2}} \csc^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) - \frac{1}{2}\pi \sqrt{-\frac{1}{z^2}}\, z$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

01.28.27.1202.01

$$\coth^{-1}(z) = i \csc^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) - \frac{\pi i}{2} \;/;\; 0 \le \arg(z) < \pi$$

01.28.27.1203.01

$$\coth^{-1}(z) = -i \csc^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1204.01

$$\coth^{-1}(z) = \sqrt{-\frac{1}{z^2}}\, z \csc^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) - \frac{1}{2}\pi \sqrt{-\frac{1}{z^2}}\, z$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

01.28.27.1205.01

$$\coth^{-1}(z) = i \csc^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1206.01

$$\coth^{-1}(z) = -i \csc^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1207.01

$$\coth^{-1}(z) = -i \csc^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1208.01

$$\coth^{-1}(z) = i \csc^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1209.01

$$\coth^{-1}(z) = \sqrt{\frac{z^2-1}{z^2}} \sqrt{\frac{z^2}{z^2-1}} \sqrt{-\frac{1}{z^2}}\, z \csc^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) - \frac{1}{2}\pi \sqrt{-\frac{1}{z^2}}\, z$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

01.28.27.1210.01

$$\coth^{-1}(z) = i \csc^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) - \frac{\pi i}{2} \;/;\; 0 \leq \arg(z) < \pi$$

01.28.27.1211.01

$$\coth^{-1}(z) = -i \csc^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1212.01

$$\coth^{-1}(z) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z + \sqrt{-\frac{1}{z^2}}\, z \csc^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z^2)^{1/4} \Big/ \sqrt{\sqrt{1-z^2}+1}\right)$

01.28.27.1213.01

$$\coth^{-1}(z) = -2 i \csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1214.01

$$\coth^{-1}(z) = 2 i \csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1215.01

$$\coth^{-1}(z) = -2 i \csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) + \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1216.01

$$\coth^{-1}(z) = 2 i \csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1217.01

$$\coth^{-1}(z) = \frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z^2)^{1/4}\big/\sqrt{\sqrt{1-z^2}-1}\right)$

01.28.27.1218.01

$$\coth^{-1}(z) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1219.01

$$\coth^{-1}(z) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1220.01

$$\coth^{-1}(z) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1221.01

$$\coth^{-1}(z) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1222.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} - \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z^2}\big/\left(\sqrt{1-z^2}+1\right)}\right)$

01.28.27.1223.01

$$\coth^{-1}(z) = -2 i \csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1224.01

$$\coth^{-1}(z) = 2 i \csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1225.01

$$\coth^{-1}(z) = -2 i \csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) + \frac{3\pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1226.01

$$\coth^{-1}(z) = 2 i \csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1227.01

$$\coth^{-1}(z) = \frac{2\sqrt{-z^2}}{z} \csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z^2}\Big/\left(\sqrt{1-z^2}-1\right)}\right)$

01.28.27.1228.01

$$\coth^{-1}(z) = 2 i \csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1229.01

$$\coth^{-1}(z) = -2 i \csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1230.01

$$\coth^{-1}(z) = \frac{2 z\sqrt{-1+z^2}}{\sqrt{z^2-z^4}} \csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} - \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{2}\left(z^2-1\right)^{1/4}\Big/\sqrt{\sqrt{z^2-1}+z}\right)$

01.28.27.1231.01

$$\coth^{-1}(z) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\left(z^2-1\right)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right)-\pi\,i\;/;\;0\le\arg(z)\le\frac{\pi}{2}$$

01.28.27.1232.01

$$\coth^{-1}(z) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\left(z^2-1\right)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right)+\pi\,i\;/;\;-\frac{\pi}{2}<\arg(z)<0$$

01.28.27.1233.01

$$\coth^{-1}(z) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\left(z^2-1\right)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right)\;/;\;\frac{\pi}{2}<\arg(z)<\pi$$

01.28.27.1234.01

$$\coth^{-1}(z) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\left(z^2-1\right)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right)\;/;\;-\pi<\arg(z)\le-\frac{\pi}{2}\bigvee(z\in\mathbb{R}\land z<0)$$

01.28.27.1235.01

$$\coth^{-1}(z) = 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\csc^{-1}\left(\frac{\sqrt{2}\left(z^2-1\right)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right)-\frac{\pi\left(z+\sqrt{z^2}\right)}{2\sqrt{z}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{2}\left(z^2-1\right)^{1/4}\Big/\sqrt{\sqrt{z^2-1}-z}\right)$

01.28.27.1236.01

$$\coth^{-1}(z) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\left(z^2-1\right)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right)\;/;\;0\le\arg(z)\le\frac{\pi}{2}$$

01.28.27.1237.01

$$\coth^{-1}(z) = 2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1238.01

$$\coth^{-1}(z) = -\pi\,i + 2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) /;\ \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1239.01

$$\coth^{-1}(z) = \pi\,i - 2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1240.01

$$\coth^{-1}(z) = \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1-\frac{\sqrt{z^2}}{z}\right) - 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\,\csc^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right)$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{2\sqrt{z^2-1}\Big/\left(\sqrt{z^2-1}+z\right)}\right)$

01.28.27.1241.01

$$\coth^{-1}(z) = 2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) - \pi\,i /;\ 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1242.01

$$\coth^{-1}(z) = -2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) + \pi\,i /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1243.01

$$\coth^{-1}(z) = -2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) /;\ \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1244.01

$$\coth^{-1}(z) = 2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1245.01

$$\coth^{-1}(z) = 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\sqrt{z+1}\sqrt{\frac{1}{z+1}}\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) - \frac{\pi\left(z+\sqrt{z^2}\right)}{2\sqrt{z}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(z)$ and $\csc^{-1}\left(\sqrt{2\sqrt{z^2-1}\Big/\left(\sqrt{z^2-1}-z\right)}\right)$

01.28.27.1246.01

$$\coth^{-1}(z) = -2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right)\ /;\ 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1247.01

$$\coth^{-1}(z) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right)\ /;\ -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1248.01

$$\coth^{-1}(z) = -\pi\,i + 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right)\ /;\ \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1249.01

$$\coth^{-1}(z) = \pi\,i - 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right)\ /;\ -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1250.01

$$\coth^{-1}(z) = \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1-\frac{\sqrt{z^2}}{z}\right) - 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\sqrt{1-z}\sqrt{\frac{1}{1-z}}\csc^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\frac{1-z}{1+z}\right)$

01.28.27.1251.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1-z}{1+z}\right) - \frac{\pi\,i}{4}\ /;\ 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1252.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\,i\csc^{-1}\left(\frac{1-z}{1+z}\right) + \frac{\pi\,i}{4}\ /;\ \operatorname{Im}(z) < 0$$

01.28.27.1253.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\, i \csc^{-1}\left(\frac{1-z}{1+z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1254.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{4}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}} + i\sqrt{z}\,\sqrt{-\frac{1}{z}} - 1\right) + \frac{\sqrt{1-z}\,\sqrt{-z^2}}{2z}\,\sqrt{\frac{1}{1-z}}\,\csc^{-1}\left(\frac{1-z}{1+z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\frac{z-1}{z+1}\right)$

01.28.27.1255.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2}\csc^{-1}\left(\frac{z-1}{z+1}\right) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1256.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\, i \csc^{-1}\left(\frac{z-1}{z+1}\right) + \frac{\pi i}{4} \;/;\; \mathrm{Im}(z) < 0$$

01.28.27.1257.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\, i \csc^{-1}\left(\frac{z-1}{z+1}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1258.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{4}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}} + i\sqrt{z}\,\sqrt{-\frac{1}{z}} - 1\right) - \frac{\sqrt{1-z}\,\sqrt{-z^2}}{2z}\,\sqrt{\frac{1}{1-z}}\,\csc^{-1}\left(\frac{z-1}{z+1}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

01.28.27.1259.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\, i \csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{2} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1260.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) + \frac{\pi i}{2} \;/;\; |z| < 1 \land \mathrm{Im}(z) < 0$$

01.28.27.1261.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1262.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{-z^2}}{2z}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}} \;/;\; |z| < 1$$

01.28.27.1263.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1264.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1265.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z} \csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; |z| > 1$$

01.28.27.1266.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi\sqrt{z}}{4} \sqrt{-\frac{1}{z}} \left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) - \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)} \sqrt{\left(\frac{1-z}{1+z}\right)^2} \csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$

01.28.27.1267.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2} i \csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi i}{2} /; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1268.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{\pi i}{2} /; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.1269.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1270.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z} \csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi\sqrt{z}}{2} \sqrt{-\frac{1}{z}} /; |z| < 1$$

01.28.27.1271.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1272.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2} \csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1273.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{-z^2}}{2z} \csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| > 1$$

01.28.27.1274.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi\sqrt{z}}{4} \sqrt{-\frac{1}{z}} \left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) + \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)} \sqrt{\left(\frac{1-z}{1+z}\right)^2} \csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| \neq 1$$

Involving $\coth^{-1}(\sqrt{z})$ and $\csc^{-1}(\sqrt{1-z})$

01.28.27.1275.01

$$\coth^{-1}(\sqrt{z}) = -i \csc^{-1}(\sqrt{1-z}) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1276.01

$$\coth^{-1}(\sqrt{z}) = i \csc^{-1}(\sqrt{1-z}) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1277.01

$$\coth^{-1}(\sqrt{z}) = i \csc^{-1}(\sqrt{1-z}) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1278.01

$$\coth^{-1}(\sqrt{z}) = \frac{\sqrt{-z^2}}{z} \csc^{-1}(\sqrt{1-z}) - \frac{\pi i}{2}\left(1 - \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

01.28.27.1279.01

$$\coth^{-1}(\sqrt{z}) = i \csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) \geq 0$$

01.28.27.1280.01

$$\coth^{-1}(\sqrt{z}) = -i \csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1281.01

$$\coth^{-1}(\sqrt{z}) = \sqrt{z} \sqrt{-\frac{1}{z}} \csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

01.28.27.1282.01

$$\coth^{-1}(\sqrt{z}) = i \csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1283.01

$$\coth^{-1}(\sqrt{z}) = -i \csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1284.01

$$\coth^{-1}(\sqrt{z}) = -i \csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1285.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{z-1}\,\sqrt{-\frac{1}{z}}\,\sqrt{\frac{z}{z-1}}\,\csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

01.28.27.1286.01

$$\coth^{-1}\left(\sqrt{z}\right) = i\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) \geq 0$$

01.28.27.1287.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1288.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{\frac{1}{1-z}}\,\sqrt{z-1}\,\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}+1}\right)$

01.28.27.1289.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) + \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1290.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1291.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1292.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) - \pi\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} + \frac{\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}-1}\right)$

01.28.27.1293.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}\,-1}}\right) - \frac{\pi\,i}{2}\ /;\ 0 < \arg(z) \leq \pi$$

01.28.27.1294.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}\,-1}}\right) + \frac{\pi\,i}{2}\ /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1295.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}\,-1}}\right) - \frac{\pi\,i}{2}\ /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1296.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}\,-1}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}\,+1\right)}\right)$

01.28.27.1297.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}\,+1}}\right) + \frac{\pi\,i}{2}\ /;\ 0 < \arg(z) \leq \pi$$

01.28.27.1298.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}\,+1}}\right) - \frac{\pi\,i}{2}\ /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1299.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}\,+1}}\right) - \frac{3\,\pi\,i}{2}\ /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1300.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}\,+1}}\right) - \pi\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} + \frac{\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}\,-1\right)}\right)$

01.28.27.1301.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}\,-1}}\right) - \frac{\pi\,i}{2}\ /;\ 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1302.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) + \frac{\pi\,i}{2}\ /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1303.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{2\sqrt{z-1}}{\sqrt{1-z}}\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}+\sqrt{-z}}\right)$

01.28.27.1304.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \pi\,i\ /;\ 0 < \arg(z) \le \pi \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1305.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) + \pi\,i\ /;\ \operatorname{Im}(z) < 0$$

01.28.27.1306.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right)\ /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1307.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi\,i}{2}\left(1 + 2\,i\sqrt{z}\sqrt{-\frac{1}{z}} - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right) - \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}-\sqrt{-z}}\right)$

01.28.27.1308.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)\ /;\ 0 < \arg(z) \le \pi$$

01.28.27.1309.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)\ /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1310.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) - \pi\,i\ /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1311.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}}-1\right)+\frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z}/\left(\sqrt{1-z}+\sqrt{-z}\right)}\right)$

01.28.27.1312.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)-\pi i\;/;\;0<\arg(z)\leq\pi\bigvee(z\in\mathbb{R}\land z>1)$$

01.28.27.1313.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)+\pi i\;/;\;\operatorname{Im}(z)<0$$

01.28.27.1314.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)\;/;\;(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.1315.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(1+2\,i\sqrt{z}\,\sqrt{-\frac{1}{z}}-\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}}\right)-\frac{2\sqrt{-z^2}\,\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z}/\left(\sqrt{1-z}-\sqrt{-z}\right)}\right)$

01.28.27.1316.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right)\;/;\;0<\arg(z)\leq\pi$$

01.28.27.1317.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right)\;/;\;\operatorname{Im}(z)<0\lor(z\in\mathbb{R}\land z>1)$$

01.28.27.1318.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right)-\pi i\;/;\;(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.1319.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}}-1\right)+\frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\frac{1-z}{1+z}\right)$

01.28.27.1320.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1-z}{1+z}\right) + \frac{\pi i}{4} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1321.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\csc^{-1}\left(\frac{1-z}{1+z}\right) - \frac{\pi i}{4} \;/;\; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1322.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1-z}{1+z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1323.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right) + \frac{\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\csc^{-1}\left(\frac{1-z}{1+z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\frac{z-1}{z+1}\right)$

01.28.27.1324.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\csc^{-1}\left(\frac{z-1}{z+1}\right) + \frac{\pi i}{4} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1325.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{z-1}{z+1}\right) - \frac{\pi i}{4} \;/;\; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1326.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\csc^{-1}\left(\frac{z-1}{z+1}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1327.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right) - \frac{\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\csc^{-1}\left(\frac{z-1}{z+1}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

01.28.27.1328.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1329.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; |z| < 1 \land -\pi < \arg(z) \leq 0$$

01.28.27.1330.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\sqrt{-z^2}}{2z}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; |z| < 1$$

01.28.27.1331.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) + \frac{\pi i}{2} /; |z| > 1 \land 0 < \arg(z) \leq \pi$$

01.28.27.1332.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{2} /; |z| > 1 \land -\pi < \arg(z) \leq 0$$

01.28.27.1333.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi\sqrt{-z^2}}{2z} /; |z| > 1$$

01.28.27.1334.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi\sqrt{-z^2}}{4z}\left(1 - \frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right) - \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\csc^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$

01.28.27.1335.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| < 1 \land 0 < \arg(z) \leq \pi$$

01.28.27.1336.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| < 1 \land -\pi < \arg(z) \leq 0$$

01.28.27.1337.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| < 1$$

01.28.27.1338.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{\pi i}{2} /; |z| > 1 \land 0 < \arg(z) \leq \pi$$

01.28.27.1339.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi i}{2} /; |z| > 1 \land -\pi < \arg(z) \leq 0$$

01.28.27.1340.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\sqrt{-z^2}}{2\,z}\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi\sqrt{-z^2}}{2\,z} \;/;\; |z| > 1$$

01.28.27.1341.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi\sqrt{-z^2}}{4\,z}\left(1 - \frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right) + \frac{\sqrt{-z^2}\,(1+z)}{2\,z\,(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\csc^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{1-z}\right)$

01.28.27.1342.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\csc^{-1}\left(\sqrt{1-z}\right) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1343.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\csc^{-1}\left(\sqrt{1-z}\right) - \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.1344.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{z}\csc^{-1}\left(\sqrt{1-z}\right) - \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

01.28.27.1345.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) /;\; 0 < \arg(z) \leq \pi \bigwedge (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1346.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) /;\; \operatorname{Im}(z) < 0$$

01.28.27.1347.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) - \pi\,i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1348.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\,i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) + \sqrt{\frac{1}{1-z}}\sqrt{-1+z}\csc^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

01.28.27.1349.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.1350.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1351.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1352.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) + \frac{\sqrt{1-z}\sqrt{z}}{\sqrt{-z}}\sqrt{\frac{1}{1-z}}\csc^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

01.28.27.1353.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1354.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.1355.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1356.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) + \sqrt{\frac{1}{1-z}}\sqrt{-1+z}\csc^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \Big/ \sqrt{\sqrt{1-z}+1}\right)$

01.28.27.1357.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) + \pi i /; 0 < \arg(z) \leq \pi$$

01.28.27.1358.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) - \pi i /; -\pi < \arg(z) \leq 0$$

01.28.27.1359.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\big/\sqrt{\sqrt{1-z}-1}\right)$

01.28.27.1360.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) /;\ 0 < \arg(z) \leq \pi$$

01.28.27.1361.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) /;\ -\pi < \arg(z) \leq 0$$

01.28.27.1362.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z}\big/\left(\sqrt{1-z}+1\right)}\right)$

01.28.27.1363.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) + \pi\,i /;\ 0 < \arg(z) \leq \pi$$

01.28.27.1364.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \pi\,i /;\ -\pi < \arg(z) \leq 0$$

01.28.27.1365.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z}\big/\left(\sqrt{1-z}-1\right)}\right)$

01.28.27.1366.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) /;\ 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1367.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1368.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{1-z}}{\sqrt{z-1}}\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \Big/ \sqrt{\sqrt{1-z}+\sqrt{-z}}\right)$

01.28.27.1369.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi\,i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.1370.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi\,i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1371.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{3\,\pi\,i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1372.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{-z^2}}{z}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) - \frac{2\sqrt{-z^2}\,\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \Big/ \sqrt{\sqrt{1-z}-\sqrt{-z}}\right)$

01.28.27.1373.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\,i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.1374.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\,\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi\,i}{2} /; -\pi < \arg(z) \leq 0$$

01.28.27.1375.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}+\sqrt{-z}\right)}\right)$

01.28.27.1376.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.1377.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1378.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{3\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1379.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{-z^2}}{z}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) - \frac{2\sqrt{-z^2}\,\sqrt{1-z}}{z}\,\sqrt{\frac{1}{1-z}}\,\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}-\sqrt{-z}\right)}\right)$

01.28.27.1380.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.1381.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \le 0$$

01.28.27.1382.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{2\sqrt{-z^2}}{z}\csc^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\csc^{-1}\left(\sqrt{z}\right)$

01.28.27.1383.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i\csc^{-1}\left(\sqrt{z}\right) \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.1384.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -i\csc^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1385.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i\csc^{-1}\left(\sqrt{z}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0019.02

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - 1\right) + \frac{\sqrt{z-1}}{\sqrt{1-z}}\csc^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\csc^{-1}\left(\sqrt{z}\right)$

01.28.27.1386.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -\frac{\pi i}{2} + i\csc^{-1}\left(\sqrt{z}\right) /; 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1387.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi i}{2} - i\csc^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1388.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}}\csc^{-1}\left(\sqrt{z}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\csc^{-1}\left(\sqrt{z}\right)$

01.28.27.1389.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\frac{\pi i}{2} + i\csc^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) \geq 0$$

01.28.27.1390.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\pi i}{2} - i\csc^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.1391.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}} + \sqrt{z}\sqrt{-\frac{1}{z}}\csc^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1392.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) == -i \csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1393.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) == i \csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.1394.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) == i \csc^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1395.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) == \frac{\sqrt{1-z}}{\sqrt{z-1}} \csc^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2}\left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1396.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) == -i \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1397.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) == i \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1398.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) == i \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1399.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) == \frac{\sqrt{1-z}}{\sqrt{z-1}} \sqrt{z} \sqrt{\frac{1}{z}} \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2}\left(\sqrt{1-z} \sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1400.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /;\ 0 < \arg(z) \leq \pi$$

01.28.27.1401.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1402.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /;\ (z \in \mathbb{R} \land z > 1)$$

01.28.27.1403.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\sqrt{-z^2}}{z}\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1404.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /;\ \operatorname{Im}(z) > 0$$

01.28.27.1405.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 1)$$

01.28.27.1406.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /;\ (z \in \mathbb{R} \land z > 1)$$

01.28.27.1407.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \sqrt{\frac{1}{z}}\sqrt{-z}\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1408.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1409.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.1410.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1411.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -\frac{\sqrt{-1+z}}{\sqrt{1-z}}\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1412.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1413.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1414.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1415.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -\frac{\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}}\sqrt{\frac{1}{z}}\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1416.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2} - i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1417.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -\frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1418.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -\frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.1419.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(1 + i\sqrt{-z}\sqrt{\frac{1}{z}} - \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\right) - \frac{\sqrt{-1+z}}{\sqrt{1-z}} \csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

01.28.27.1420.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - \frac{i\sqrt{z-1}}{\sqrt{1-z}} - 1\right) - \frac{\sqrt{z-1}}{\sqrt{1-z}} \csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1421.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2} - i \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1422.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -\frac{\pi i}{2} + i \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1423.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(1 + i\sqrt{-z}\sqrt{\frac{1}{z}} - \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\right) - \frac{\sqrt{z-1}}{\sqrt{1-z}}\sqrt{z}\sqrt{\frac{1}{z}} \csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

01.28.27.1424.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - \frac{i\sqrt{z-1}}{\sqrt{1-z}} - 1\right) - \frac{\sqrt{z-1}}{\sqrt{1-z}}\sqrt{z}\sqrt{\frac{1}{z}} \csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1425.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1426.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == -\frac{\pi i}{2} + i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1427.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == -\frac{\pi i}{2} - i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.1428.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == \frac{\sqrt{-z}}{\sqrt{z}}\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1429.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == \frac{\pi i}{2} - i\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1430.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == -\frac{\pi i}{2} + i\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.1431.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == \sqrt{-z}\sqrt{\frac{1}{z}}\csc^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\csc^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1432.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == \frac{\pi i}{2} - i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1433.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == -\frac{\pi i}{2} + i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1434.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == -\frac{\pi i}{2} - i\csc^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.1435.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -\frac{\sqrt{z}}{\sqrt{-z}} \csc^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\csc^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1436.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \frac{\pi i}{2} - i \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1437.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -\frac{\pi i}{2} + i \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.1438.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \sqrt{-z}\sqrt{\frac{1}{z}} \csc^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z+a}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1439.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = -\frac{i}{2} \csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.1440.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{i}{2} \csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1441.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = -\frac{i}{2} \csc^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1442.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + \frac{i\sqrt{1-z}}{2\sqrt{z-1}} - 1\right) + \frac{\sqrt{1-z}}{2\sqrt{z-1}} \csc^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1443.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1444.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2} i \csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1445.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2} i \csc^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1446.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} - \sqrt{z}\sqrt{-\frac{1}{z}}\right) - \frac{\sqrt{z-1}}{2\sqrt{1-z}}\csc^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-a-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1447.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.1448.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2} i \csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.1449.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1450.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{\pi i}{4}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + i\sqrt{-z}\sqrt{\frac{1}{z}} - 1\right) + \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\csc^{-1}\left(\frac{1}{z}\right)$$

01.28.27.1451.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2}\left(1 - \frac{i\sqrt{-z-1}}{2\sqrt{z+1}} - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1452.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; \text{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1453.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2} i \csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \text{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.1454.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2} i \csc^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1455.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}\left(\frac{\sqrt{-z}\, z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\sqrt{-\frac{1}{z}} + \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-a}{z+a}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1456.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \text{Im}(z) > 0$$

01.28.27.1457.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2} i \csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; \text{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.1458.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1459.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + \frac{i\sqrt{-z-1}}{2\sqrt{z+1}} - 1\right) + \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\csc^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1460.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{i}{2}\csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1461.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\, i \csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1462.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\, i \csc^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1463.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} + i\sqrt{z}\,\sqrt{-\frac{1}{z}} - 1\right) + \frac{\sqrt{1-z}}{2\sqrt{z-1}} \csc^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$ and $\csc^{-1}(z)$

01.28.27.1464.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = i \csc^{-1}(z) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1465.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -i \csc^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1466.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -i \csc^{-1}(z) - \pi i \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1467.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = i \csc^{-1}(z) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.0017.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -\frac{\sqrt{-z^2}}{z} \csc^{-1}(z) \;/;\; z \notin (-1, 1)$$

01.28.27.0018.02

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \frac{\sqrt{z^2}\,\sqrt{z^2-1}}{z\sqrt{1-z^2}} \csc^{-1}(z) - \frac{\pi}{2}\left(\frac{\sqrt{-z-1}}{\sqrt{z+1}} + \frac{\sqrt{z-1}}{\sqrt{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$ and $\csc^{-1}(z)$

01.28.27.1468.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i\csc^{-1}(z) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1469.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i\csc^{-1}(z) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1470.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i\csc^{-1}(z) + \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1471.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i\csc^{-1}(z) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1472.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\csc^{-1}(z) + \frac{\pi\sqrt{1-z^2}}{2\sqrt{z^2-1}}$$

01.28.27.0020.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\frac{\pi}{2} - \frac{\sqrt{z^2}}{z}\csc^{-1}(z)\right)$$

01.28.27.0021.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{1}{\sqrt{1-z^2}}\left(\sqrt{1-\frac{1}{z^2}}\, z\csc^{-1}(z) - \frac{\pi}{2}\sqrt{z^2-1}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$ and $\csc^{-1}(z)$

01.28.27.1473.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i\csc^{-1}(z) - \frac{\pi i}{2} /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1474.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i\csc^{-1}(z) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1475.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i\csc^{-1}(z) + \frac{\pi i}{2} \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1476.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i\csc^{-1}(z) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1477.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \sqrt{-\frac{1}{z^2}}\, z\csc^{-1}(z) - \frac{\pi\sqrt{z^2}}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$ and $\csc^{-1}(z)$

01.28.27.1478.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\frac{\pi i}{2} + i\csc^{-1}(z) \;/;\; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.1479.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \frac{\pi i}{2} - i\csc^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1480.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\frac{\pi i}{2} - i\csc^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1481.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \frac{\pi i}{2} + i\csc^{-1}(z) \;/;\; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1482.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \sqrt{z^2}\sqrt{-\frac{1}{z^2}}\csc^{-1}(z) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1483.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1) \bigvee (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.1484.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1485.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1486.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0) \bigvee (i z \in \mathbb{R} \land i z < 0)$$

01.28.27.1487.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}} \left(\frac{\pi z}{2} \sqrt{\frac{1}{z^2}} - \csc^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1488.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1489.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -\frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \le \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1490.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -\frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \le \arg(z) < \pi \bigvee (z \in \mathbb{R} \wedge z < -1)$$

01.28.27.1491.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.28.27.1492.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}} \left(\frac{\pi\sqrt{z^2}}{2} \sqrt{\frac{1}{z^2}} - \frac{\sqrt{z^2}}{z} \csc^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1493.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.1494.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -\frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \le \arg(z) \le 0$$

01.28.27.1495.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -\frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \le \arg(z) \le \pi$$

01.28.27.1496.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.1497.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\sqrt{-z}}{\sqrt{z}} \csc^{-1}\left(\frac{1}{z}\right) - \frac{1}{2} \pi \sqrt{-z^2} \sqrt{\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1498.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.1499.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -\frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.28.27.1500.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -\frac{\pi i}{2} - i \csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.1501.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\pi i}{2} + i \csc^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.1502.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\sqrt{-z^2}}{z} \csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi \sqrt{-z^2}}{2} \sqrt{\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1503.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i \csc^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.1504.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i \csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1505.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i \csc^{-1}\left(\frac{1}{z}\right) + \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1506.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i \csc^{-1}\left(\frac{1}{z}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1507.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} \csc^{-1}\left(\frac{1}{z}\right) \;/;\; z \notin (-\infty, -1) \bigwedge z \notin (1, \infty)$$

01.28.27.1508.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} \csc^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - \sqrt{z+1}\,\sqrt{\frac{1}{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1509.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -i \csc^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1510.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i \csc^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1511.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -i \csc^{-1}\left(\frac{1}{z}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1512.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i \csc^{-1}\left(\frac{1}{z}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1513.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z^2}\,\sqrt{\frac{1}{1-z^2}} - 1\right) + \frac{\sqrt{z^2-z^4}}{z\sqrt{z^2-1}} \csc^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1514.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i\csc^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1515.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i\csc^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1516.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i\csc^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1517.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i\csc^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1518.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - 1\right) + \frac{\sqrt{-z}}{\sqrt{z}}\csc^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1519.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -i\csc^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1520.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i\csc^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1521.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -i\csc^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1522.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i\csc^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1523.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - 1\right) - \frac{z\sqrt{-1+z^2}}{\sqrt{z^2-z^4}}\csc^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$ and $\csc^{-1}\left(\frac{i}{z}\right)$

01.28.27.1524.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = \frac{i}{2}\csc^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right)$ and $\csc^{-1}\left(\frac{i}{z}\right)$

01.28.27.1525.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi i}{2} + \frac{i}{2}\csc^{-1}\left(\frac{i}{z}\right) /; 0 \leq \arg(z) < \pi$$

01.28.27.1526.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi i}{2} + \frac{i}{2}\csc^{-1}\left(\frac{i}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1527.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\,z + \frac{i}{2}\csc^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right)$ and $\csc^{-1}\left(\frac{i}{z}\right)$

01.28.27.1528.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi i}{2} + \frac{i}{2}\csc^{-1}\left(\frac{i}{z}\right) /; 0 \le \arg(z) < \pi$$

01.28.27.1529.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{\pi i}{2} + \frac{i}{2}\csc^{-1}\left(\frac{i}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1530.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z + \frac{i}{2}\csc^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right)$ and $\csc^{-1}\left(\frac{i}{z}\right)$

01.28.27.1531.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = \frac{i}{2}\csc^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right)$ and $\csc^{-1}(z)$

01.28.27.1532.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = \frac{\pi i}{2} - 2\, i\csc^{-1}(z) /; 0 < \arg(z) \le \frac{\pi}{2}$$

01.28.27.1533.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = -\frac{\pi i}{2} + 2\, i\csc^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1534.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = -\frac{\pi i}{2} - 2\, i\csc^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1535.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = \frac{\pi i}{2} + 2 i \csc^{-1}(z) \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.1536.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{-2+z^2}\right) = i\pi\left(1 - \frac{i\sqrt{z^2}}{2\sqrt{-z^2}} - \sqrt{\frac{z^2}{z^2-1}}\sqrt{\frac{z^2-1}{z^2}}\right) - \frac{2z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\csc^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right)$ and $\csc^{-1}(z)$

01.28.27.1537.01

$$\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right) = -2 i \csc^{-1}(z) \;/;\; |z| > \sqrt{2} \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1538.01

$$\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right) = 2 i \csc^{-1}(z) \;/;\; |z| > \sqrt{2} \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1539.01

$$\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\pi\left(\theta\left(\left|\sqrt{z^2-1}\right|-1\right)-1\right) + \frac{2\sqrt{z^2}}{z}\csc^{-1}(z)\right)$$

01.28.27.1540.01

$$\coth^{-1}\left(\frac{-2+z^2}{2\sqrt{1-z^2}}\right) =$$

$$-\frac{\pi}{2\sqrt{1-z^2}}\left(\left(z^2-2\right)\sqrt{\frac{z^4}{z^2-1}}\sqrt{\frac{z^2-1}{z^4}}\sqrt{\frac{z^2-1}{\left(z^2-2\right)^2}} - \sqrt{1-\frac{1}{z^2}}\, z\left(\sqrt{\frac{1}{z^2}}\, z - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + \sqrt{\frac{i}{z}}\sqrt{-i z} - \sqrt{-\frac{i}{z}}\sqrt{i z} + \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right)\right) - \frac{2z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\csc^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1541.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{\pi i}{2} + 2i\csc^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1) \bigvee (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.1542.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} - 2i\csc^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1543.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{\pi i}{2} - 2i\csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1544.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} + 2i\csc^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0) \bigvee (i z \in \mathbb{R} \land i z < 0)$$

01.28.27.1545.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{3\pi i}{2} - 2i\csc^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1546.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{3\pi i}{2} - 2i\csc^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1547.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\frac{\pi}{2}\left(-\sqrt{\frac{1}{1-z}}\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\sqrt{z+1} - \sqrt{-i z}\sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}}\sqrt{i z} + \frac{\sqrt{z^2}}{z}\right) - 2\csc^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$ and $\csc^{-1}\left(\frac{1}{z}\right)$

01.28.27.1548.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = 2\,i\csc^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{4} \le \arg(z) \le \frac{\pi}{2} \bigvee -\frac{3\pi}{4} \le \arg(z) \le -\frac{\pi}{2}$$

01.28.27.1549.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(2\csc^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}\left(\frac{\sqrt{z^2-1}\,z}{\sqrt{z^4-z^2}} + \sqrt{\frac{1}{z}}\sqrt{\frac{1}{\sqrt{2}\,z-1}}\sqrt{\sqrt{2}\,z-1}\sqrt{z} - \sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{-\sqrt{2}\,z-1}\sqrt{-\frac{1}{\sqrt{2}\,z+1}} + \frac{\sqrt{z^2}}{z}\right)\right)$$

Involving $\sec^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\frac{i(1-z^2)}{2z}\right)$

01.28.27.1550.01

$$\coth^{-1}(z) = -\frac{i}{2}\sec^{-1}\left(\frac{i(1-z^2)}{2z}\right) + \frac{3\pi i}{4} /; |z| < 1 \land (\operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0))$$

01.28.27.1551.01

$$\coth^{-1}(z) = -\frac{i}{2}\sec^{-1}\left(\frac{i(1-z^2)}{2z}\right) - \frac{\pi i}{4} /; |z| < 1 \bigwedge 0 \le \arg(z) < \pi$$

01.28.27.1552.01

$$\coth^{-1}(z) = \frac{1}{2}\pi\left(-z\sqrt{-\frac{1}{z^2}} + \frac{i}{2}\right) - \frac{1}{2}\,i\sec^{-1}\left(\frac{i(1-z^2)}{2z}\right) /; |z| < 1$$

01.28.27.1553.01

$$\coth^{-1}(z) = \frac{1}{2}\,i\left(\sec^{-1}\left(\frac{i(1-z^2)}{2z}\right) - \frac{\pi}{2}\right) /; |z| > 1$$

01.28.27.1554.01

$$\coth^{-1}(z) = \frac{1}{4}\pi\left(\frac{z-1}{z+1}\sqrt{\left(\frac{z+1}{z-1}\right)^2}\left(-i + \sqrt{-\frac{1}{z^2}}\,z\right) - \sqrt{-\frac{1}{z^2}}\,z\right) + \frac{i(z-1)}{2(z+1)}\sqrt{\left(\frac{z+1}{z-1}\right)^2}\sec^{-1}\left(\frac{i(1-z^2)}{2z}\right) /; |z| \ne 1$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\frac{i(z^2-1)}{2z}\right)$

01.28.27.1555.01

$$\coth^{-1}(z) = \frac{i}{2}\sec^{-1}\left(\frac{i(z^2-1)}{2z}\right) + \frac{\pi i}{4} /; |z| < 1 \land (\operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0))$$

01.28.27.1556.01

$$\coth^{-1}(z) = \frac{i}{2} \sec^{-1}\left(\frac{i\left(z^2-1\right)}{2z}\right) - \frac{3\pi i}{4} \;/;\; |z| < 1 \bigwedge 0 \le \arg(z) < \pi$$

01.28.27.1557.01

$$\coth^{-1}(z) = -\frac{\pi}{2}\left(z\sqrt{-\frac{1}{z^2}} + \frac{i}{2}\right) + \frac{1}{2} i \sec^{-1}\left(\frac{i\left(z^2-1\right)}{2z}\right) \;/;\; |z| < 1$$

01.28.27.1558.01

$$\coth^{-1}(z) = \frac{i}{2}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{i\left(z^2-1\right)}{2z}\right)\right) \;/;\; |z| > 1$$

01.28.27.1559.01

$$\coth^{-1}(z) = \frac{\pi}{4}\left(-\sqrt{-\frac{1}{z^2}}\, z + \frac{z-1}{z+1}\sqrt{\left(\frac{1+z}{-1+z}\right)^2}\left(i + \sqrt{-\frac{1}{z^2}}\, z\right)\right) - \frac{i(z-1)}{2(z+1)}\sqrt{\left(\frac{1+z}{-1+z}\right)^2} \sec^{-1}\left(\frac{i\left(z^2-1\right)}{2z}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\frac{1-z^2}{1+z^2}\right)$

01.28.27.1560.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + \frac{1}{2} i \sec^{-1}\left(\frac{1-z^2}{1+z^2}\right) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1561.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - \frac{1}{2} i \sec^{-1}\left(\frac{1-z^2}{1+z^2}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1562.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - \frac{1}{2} i \sec^{-1}\left(\frac{1-z^2}{1+z^2}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1563.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + \frac{1}{2} i \sec^{-1}\left(\frac{1-z^2}{1+z^2}\right) \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1564.01

$$\coth^{-1}(z) = -\frac{\sqrt{-z^2}\sqrt{1-z^2}}{2z}\sqrt{\frac{1}{1-z^2}} \sec^{-1}\left(\frac{1-z^2}{1+z^2}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\frac{z^2-1}{z^2+1}\right)$

01.28.27.1565.01

$$\coth^{-1}(z) = -\frac{1}{2} i \sec^{-1}\left(\frac{z^2-1}{z^2+1}\right) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1566.01

$$\coth^{-1}(z) = \frac{1}{2} i \sec^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1567.01

$$\coth^{-1}(z) = -\pi i + \frac{1}{2} i \sec^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1568.01

$$\coth^{-1}(z) = \pi i - \frac{1}{2} i \sec^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1569.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\right) + \frac{\sqrt{-z^2}}{2z}\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}}\sec^{-1}\left(\frac{z^2-1}{z^2+1}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{1-z^2}\right)$

01.28.27.1570.01

$$\coth^{-1}(z) = i \sec^{-1}\left(\sqrt{1-z^2}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1571.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - i \sec^{-1}\left(\sqrt{1-z^2}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1572.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + i \sec^{-1}\left(\sqrt{1-z^2}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1573.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - i \sec^{-1}\left(\sqrt{1-z^2}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1574.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}} - \frac{i\sqrt{-z^2}}{z}\right) - \frac{\sqrt{-z^2}}{z}\sec^{-1}\left(\sqrt{1-z^2}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

01.28.27.1575.01

$$\coth^{-1}(z) = i \sec^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1576.01

$$\coth^{-1}(z) = -i \sec^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1577.01

$$\coth^{-1}(z) = i \sec^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) - \pi i /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1578.01

$$\coth^{-1}(z) = -i \sec^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) + \pi i /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1579.01

$$\coth^{-1}(z) = \frac{\pi}{2}\left(\sqrt{z^2} - z\right)\sqrt{-\frac{1}{z^2}} - \sqrt{z^2}\sqrt{-\frac{1}{z^2}} \sec^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

01.28.27.1580.01

$$\coth^{-1}(z) = -i \sec^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) /; 0 \leq \arg(z) < \pi$$

01.28.27.1581.01

$$\coth^{-1}(z) = i \sec^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1582.01

$$\coth^{-1}(z) = -\sqrt{-\frac{1}{z^2}}\, z \sec^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

01.28.27.1583.01

$$\coth^{-1}(z) = -i \sec^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1584.01

$$\coth^{-1}(z) = i \sec^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1585.01

$$\coth^{-1}(z) = i \sec^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1586.01

$$\coth^{-1}(z) = -i \sec^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) + \pi i /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1587.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}}\right) - \sqrt{\frac{z^2-1}{z^2}} \sqrt{\frac{z^2}{z^2-1}} \sqrt{-\frac{1}{z^2}}\, z \sec^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

01.28.27.1588.01

$$\coth^{-1}(z) = -i \sec^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) /; 0 \leq \arg(z) < \pi$$

01.28.27.1589.01

$$\coth^{-1}(z) = i \sec^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1590.01

$$\coth^{-1}(z) = -\sqrt{-\frac{1}{z^2}}\, z \sec^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{2}\left(1-z^2\right)^{1/4} \Big/ \sqrt{\sqrt{1-z^2}+1}\right)$

01.28.27.1591.01

$$\coth^{-1}(z) = 2 i \sec^{-1}\left(\frac{\sqrt{2}\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1592.01

$$\coth^{-1}(z) = -2 i \sec^{-1}\left(\frac{\sqrt{2}\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1593.01

$$\coth^{-1}(z) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) + \frac{\pi\,i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1594.01

$$\coth^{-1}(z) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) - \frac{\pi\,i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1595.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) + \frac{\pi\,i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} - \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{2}\,(1-z^2)^{1/4}\Big/\sqrt{\sqrt{1-z^2}+1}\right)$

01.28.27.1596.01

$$\coth^{-1}(z) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) + \frac{\pi\,i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1597.01

$$\coth^{-1}(z) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) - \frac{\pi\,i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1598.01

$$\coth^{-1}(z) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) - \frac{3\,\pi\,i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1599.01

$$\coth^{-1}(z) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) + \frac{3\,\pi\,i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1600.01

$$\coth^{-1}(z) = \frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z^2}\Big/\left(\sqrt{1-z^2}+1\right)}\right)$

01.28.27.1601.01

$$\coth^{-1}(z) = 2 i \sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1602.01

$$\coth^{-1}(z) = -2 i \sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1603.01

$$\coth^{-1}(z) = 2 i \sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1604.01

$$\coth^{-1}(z) = -2 i \sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1605.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} - \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z^2}\Big/\left(\sqrt{1-z^2}-1\right)}\right)$

01.28.27.1606.01

$$\coth^{-1}(z) = -2 i \sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1607.01

$$\coth^{-1}(z) = 2\,i\,\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1608.01

$$\coth^{-1}(z) = -\frac{2\,z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2}\left(\frac{i\sqrt{-z^2}}{z} - \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} + \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{2}\,(z^2-1)^{1/4}\Big/\sqrt{\sqrt{z^2-1}+z}\right)$

01.28.27.1609.01

$$\coth^{-1}(z) = \pi i - 2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right) - \pi i \;/;\; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.1610.01

$$\coth^{-1}(z) = 2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right) \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1611.01

$$\coth^{-1}(z) = 2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right) - \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1612.01

$$\coth^{-1}(z) = \pi i - 2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right) \;/;\; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1613.01

$$\coth^{-1}(z) = \frac{1}{2}\pi\sqrt{-z}\left(1 - \frac{\sqrt{z^2}}{z}\right)\sqrt{\frac{1}{z}} - 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\,\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{2}\,(z^2-1)^{1/4}\Big/\sqrt{\sqrt{z^2-1}-z}\right)$

01.28.27.1614.01

$$\coth^{-1}(z) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) - \pi\,i\;/;\;0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.1615.01

$$\coth^{-1}(z) = \pi\,i - 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right)\;/;\;-\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1616.01

$$\coth^{-1}(z) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right)\;/;\;\frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1617.01

$$\coth^{-1}(z) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right)\;/;\;-\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1618.01

$$\coth^{-1}(z) = 2\sqrt{z^2}\,\sqrt{-\frac{1}{z^2}}\,\sec^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) - \frac{1}{2}\pi\sqrt{-\frac{1}{z}}\,\sqrt{z}\left(\frac{\sqrt{z^2}}{z}+1\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{2\sqrt{z^2-1}\Big/\left(\sqrt{z^2-1}+z\right)}\right)$

01.28.27.1619.01

$$\coth^{-1}(z) = -2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right)\;/;\;0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.1620.01

$$\coth^{-1}(z) = 2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1621.01

$$\coth^{-1}(z) = 2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) - \pi\, i /;\ \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1622.01

$$\coth^{-1}(z) = \pi\, i - 2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1623.01

$$\coth^{-1}(z) = \left(1 - \frac{i\sqrt{-z}}{2\sqrt{z}} + \frac{i\sqrt{-z}\sqrt{z^2}}{2\, z^{3/2}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\right)\pi\, i - 2\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\sqrt{z+1}\sqrt{\frac{1}{z+1}} \sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{z+\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}(z)$ and $\sec^{-1}\left(\sqrt{2\sqrt{z^2-1}\Big/\left(\sqrt{z^2-1}-z\right)}\right)$

01.28.27.1624.01

$$\coth^{-1}(z) = -\pi\, i + 2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right) /;\ 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1625.01

$$\coth^{-1}(z) = \pi\, i - 2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1626.01

$$\coth^{-1}(z) = -2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right) /;\ \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1627.01

$$\coth^{-1}(z) = 2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right) /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1628.01

$$\coth^{-1}(z) = i\pi\left(1 + \frac{i\sqrt{z}}{2}\sqrt{-\frac{1}{z}} + \frac{i\sqrt{z^2}}{2\sqrt{z}}\sqrt{-\frac{1}{z}} - \sqrt{1-z}\sqrt{\frac{1}{1-z}}\right) + 2\sqrt{\frac{1}{1-z}}\sqrt{1-z}\sqrt{z^2}\sqrt{-\frac{1}{z^2}}\sec^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\frac{1-z}{1+z}\right)$

01.28.27.1629.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2}\sec^{-1}\left(\frac{1-z}{1+z}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1630.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2} i \sec^{-1}\left(\frac{1-z}{1+z}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1631.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2} i \sec^{-1}\left(\frac{1-z}{1+z}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1632.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{1-z}\sqrt{-z^2}}{2z}\sqrt{\frac{1}{1-z}}\sec^{-1}\left(\frac{1-z}{1+z}\right) - \frac{1}{2}\sqrt{z}\sqrt{-\frac{1}{z}}\,\pi$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\frac{z-1}{z+1}\right)$

01.28.27.1633.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{z-1}{z+1}\right) \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1634.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2} i \sec^{-1}\left(\frac{z-1}{z+1}\right) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1635.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2} i \sec^{-1}\left(\frac{z-1}{z+1}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1636.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - 1\right) + \frac{\sqrt{1-z}\sqrt{-z^2}}{2z}\sqrt{\frac{1}{1-z}}\sec^{-1}\left(\frac{z-1}{z+1}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

01.28.27.1637.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\, i \sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{4} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1638.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) + \frac{\pi i}{4} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.1639.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1640.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z} \sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi}{2}\left(\sqrt{z}\sqrt{-\frac{1}{z}} + \frac{\sqrt{-z^2}}{2z}\right) /;\; |z| < 1$$

01.28.27.1641.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2} \sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{4} \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1642.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{4} - \frac{i}{2} \sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1643.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)\right) /;\; |z| > 1$$

01.28.27.1644.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)} \sqrt{\left(\frac{1-z}{1+z}\right)^2} \sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi}{4}\left(\frac{i(1+z)}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\left(1 - \sqrt{-z}\sqrt{-\frac{1}{z}}\right) + \sqrt{-\frac{1}{z}}\sqrt{z}\right) /;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$

01.28.27.1645.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\, i \sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{3\pi i}{4} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1646.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2} \sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{3\pi i}{4} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.1647.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{i}{2} \sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1648.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi}{2}\left(\frac{\sqrt{-z^2}}{2z} - \sqrt{z}\sqrt{-\frac{1}{z}}\right) - \frac{\sqrt{-z^2}}{2z}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| < 1$$

01.28.27.1649.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{4} - \frac{i}{2}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1650.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{i}{2}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi i}{4} /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1651.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}}{2z}\left(\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi}{2}\right) /; |z| > 1$$

01.28.27.1652.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-z^2}\,(1+z)}{2\,(z\,(1-z))}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)\right) - \frac{\pi\sqrt{z}}{4}\sqrt{-\frac{1}{z}}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\sqrt{1-z}\right)$

01.28.27.1653.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} + i\sec^{-1}\left(\sqrt{1-z}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.1654.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\sqrt{1-z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1655.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\sec^{-1}\left(\sqrt{1-z}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1656.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\sqrt{-z^2}}{z}\sec^{-1}\left(\sqrt{1-z}\right) - \frac{1}{2}\pi\sqrt{\frac{1}{1-z}}\sqrt{-\frac{1}{z}}\sqrt{(1-z)\,z}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

01.28.27.1657.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) /; \operatorname{Im}(z) \geq 0$$

01.28.27.1658.01

$$\coth^{-1}\left(\sqrt{z}\right) = i\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.1659.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\sqrt{z}\,\sqrt{-\frac{1}{z}}\,\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

01.28.27.1660.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) /;\ 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1661.01

$$\coth^{-1}\left(\sqrt{z}\right) = i\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) /;\ \operatorname{Im}(z) < 0$$

01.28.27.1662.01

$$\coth^{-1}\left(\sqrt{z}\right) = i\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \pi i /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1663.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\sqrt{z-1}\,\sqrt{-\frac{1}{z}}\,\sqrt{\frac{z}{z-1}}\,\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{-1+z}}\,\sqrt{\frac{z-1}{z}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

01.28.27.1664.01

$$\coth^{-1}\left(\sqrt{z}\right) = -i\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right) /;\ \operatorname{Im}(z) \geq 0$$

01.28.27.1665.01

$$\coth^{-1}\left(\sqrt{z}\right) = i\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right) /;\ \operatorname{Im}(z) < 0$$

01.28.27.1666.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\sqrt{z}\,\sqrt{-\frac{1}{z}}\,\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \Big/ \sqrt{\sqrt{1-z}+1}\right)$

01.28.27.1667.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) - \frac{\pi i}{2} /;\ 0 < \arg(z) \leq \pi$$

01.28.27.1668.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) + \frac{\pi\,i}{2}\,/;\,\operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1669.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) - \frac{\pi\,i}{2}\,/;\,(z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1670.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{2\sqrt{-z^2}}{z}\,\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right) - \frac{\pi\sqrt{-1+z}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\middle/\sqrt{\sqrt{1-z}-1}\right)$

01.28.27.1671.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) + \frac{\pi\,i}{2}\,/;\,0 < \arg(z) \leq \pi$$

01.28.27.1672.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) - \frac{\pi\,i}{2}\,/;\,\operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1673.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\,\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) - \frac{3\,\pi\,i}{2}\,/;\,(z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1674.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{2\sqrt{-z^2}}{z}\,\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) - \frac{\pi}{2}\left(\frac{\sqrt{-1+z}}{\sqrt{1-z}} + \frac{2\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}+1\right)}\right)$

01.28.27.1675.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\,\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{\pi\,i}{2}\,/;\,0 < \arg(z) \leq \pi$$

01.28.27.1676.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\,\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) + \frac{\pi\,i}{2}\,/;\,\operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1677.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{\pi\,i}{2}\;/;\;(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.1678.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{\pi\sqrt{-1+z}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}+1\right)}\right)$

01.28.27.1679.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) + \frac{\pi\,i}{2}\;/;\;0<\arg(z)\le\pi\bigvee(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.1680.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) - \frac{\pi\,i}{2}\;/;\;\operatorname{Im}(z)<0\lor(z\in\mathbb{R}\land z>1)$$

01.28.27.1681.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}} - \frac{2\sqrt{z-1}}{\sqrt{1-z}}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sec^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}+\sqrt{-z}}\right)$

01.28.27.1682.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right)\;/;\;0<\arg(z)\le\pi\bigvee(z\in\mathbb{R}\land z>1)$$

01.28.27.1683.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right)\;/;\;\operatorname{Im}(z)<0$$

01.28.27.1684.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \pi\,i\;/;\;(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.1685.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi\,i}{2}\left(1-\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right) + \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sec^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}-\sqrt{-z}}\right)$

01.28.27.1686.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) - \pi\,i\;/;\;0<\arg(z)\leq\pi$$

01.28.27.1687.01

$$\coth^{-1}(\sqrt{z}) = \pi\,i - 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)\;/;\;\operatorname{Im}(z)<0\lor(z\in\mathbb{R}\land z>1)$$

01.28.27.1688.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)\;/;\;(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.1689.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi\,i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \frac{2\,i\sqrt{-z^2}}{z} - 1\right) - \frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z}\,\big/\left(\sqrt{1-z}+\sqrt{-z}\right)}\right)$

01.28.27.1690.01

$$\coth^{-1}(\sqrt{z}) = -2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)\;/;\;0<\arg(z)\leq\pi\bigvee(z\in\mathbb{R}\land z>1)$$

01.28.27.1691.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)\;/;\;\operatorname{Im}(z)<0$$

01.28.27.1692.01

$$\coth^{-1}(\sqrt{z}) = 2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \pi\,i\;/;\;(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.1693.01

$$\coth^{-1}(\sqrt{z}) = \left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - 1\right)\frac{\pi\,i}{2} + \frac{2\sqrt{-z^2}\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z}\,\big/\left(\sqrt{1-z}-\sqrt{-z}\right)}\right)$

01.28.27.1694.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) - \pi\, i \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1695.01

$$\coth^{-1}\left(\sqrt{z}\right) = \pi\, i - 2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1696.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\, i \sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1697.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \frac{2\, i\sqrt{-z^2}}{z} - 1\right)\frac{\pi\, i}{2} - \frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\frac{1-z}{1+z}\right)$

01.28.27.1698.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{1-z}{1+z}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1699.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{1-z}{1+z}\right) \;/;\; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1700.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{1-z}{1+z}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1701.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\, i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right) - \frac{\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\sec^{-1}\left(\frac{1-z}{1+z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\frac{z-1}{z+1}\right)$

01.28.27.1702.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{z-1}{z+1}\right) + \frac{\pi\, i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1703.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{z-1}{z+1}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1704.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{z-1}{z+1}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1705.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi\sqrt{-z}}{2\sqrt{z}} + \frac{\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\sec^{-1}\left(\frac{z-1}{z+1}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

01.28.27.1706.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} - \frac{i}{2}\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1707.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{4} /; |z| < 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1708.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\left(\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi}{2}\right) /; |z| < 1$$

01.28.27.1709.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) + \frac{\pi i}{4} /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1710.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{4} /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1711.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\sqrt{-z^2}}{2z}\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi\sqrt{-z^2}}{4z} /; |z| > 1$$

01.28.27.1712.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\sec^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi\sqrt{-z^2}}{4z} /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$

01.28.27.1713.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi i}{4} /; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1714.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} - \frac{i}{2}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| < 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1715.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)\right) /; |z| < 1$$

01.28.27.1716.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{3\pi i}{4} /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1717.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{3\pi i}{4} /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1718.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{2z}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{3\pi\sqrt{-z^2}}{4z} /; |z| > 1$$

01.28.27.1719.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \left(-1 + 2\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right)\frac{\pi\sqrt{-z^2}}{4z} - \frac{\sqrt{-z^2}\,(1+z)}{2z(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\sec^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{1-z}\right)$

01.28.27.1720.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\sec^{-1}\left(\sqrt{1-z}\right) /; 0 < \arg(z) \leq \pi$$

01.28.27.1721.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\sec^{-1}\left(\sqrt{1-z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1722.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\sqrt{-z^2}}{z}\sec^{-1}\left(\sqrt{1-z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

01.28.27.1723.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi \bigwedge (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1724.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1725.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1726.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{z-1}}{2\sqrt{-z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{1}{1-z}}\sqrt{-1+z}\,\sec^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

01.28.27.1727.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1728.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1729.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1730.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{z}}{2\sqrt{-z}} - \frac{\sqrt{1-z}\sqrt{z}}{\sqrt{-z}}\sqrt{\frac{1}{1-z}}\,\sec^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

01.28.27.1731.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right) \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1732.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = i\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1733.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -i\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1734.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}} - \sqrt{\frac{1}{1-z}}\sqrt{z-1}\sec^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}+1}\right)$

01.28.27.1735.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right)\;/;\;0<\arg(z)\le\pi$$

01.28.27.1736.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right)\;/;\;-\pi<\arg(z)\le 0$$

01.28.27.1737.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}-1}\right)$

01.28.27.1738.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \pi\,i - 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right)\;/;\;0<\arg(z)\le\pi$$

01.28.27.1739.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) - \pi\,i\;/;\;-\pi<\arg(z)\le 0$$

01.28.27.1740.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{-z^2}}{z}\left(2\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) - \pi\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}+1\right)}\right)$

01.28.27.1741.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right)\;/;\;0<\arg(z)\le\pi$$

01.28.27.1742.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1743.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z}/(\sqrt{1-z}-1)}\right)$

01.28.27.1744.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \pi\,i - 2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1745.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) - \pi\,i /; -\pi < \arg[z] < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1746.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}}\left(\pi - 2\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right)\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\left(\sqrt{\sqrt{1-z}+\sqrt{-z}}\right)\right)$

01.28.27.1747.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi\,i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.1748.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi\,i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1749.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi\,i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1750.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\,z}{2\sqrt{-z^2}} + \frac{2\sqrt{1-z}\,\sqrt{-z^2}}{z}\sqrt{\frac{1}{1-z}}\,\sec^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\left(\sqrt{\sqrt{1-z}-\sqrt{-z}}\right)\right)$

01.28.27.1751.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi i}{2} /;\, 0 < \arg(z) \le \pi$$

01.28.27.1752.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi i}{2} /;\, -\pi < \arg(z) \le 0$$

01.28.27.1753.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z}\Big/\left(\sqrt{1-z}+\sqrt{-z}\right)}\right)$

01.28.27.1754.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi i}{2} /;\, 0 < \arg(z) \le \pi$$

01.28.27.1755.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi i}{2} /;\, \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1756.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi i}{2} /;\, (z \in \mathbb{R} \land z > 1)$$

01.28.27.1757.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi z}{2\sqrt{-z^2}} + \frac{2\sqrt{-z^2}\,\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{2\sqrt{1-z}\Big/\left(\sqrt{1-z}-\sqrt{-z}\right)}\right)$

01.28.27.1758.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,i\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi i}{2} /;\, 0 < \arg(z) \le \pi$$

01.28.27.1759.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,i\,\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.1760.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{-z^2}}{2\,z} - \frac{2\sqrt{-z^2}}{z}\sec^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\sec^{-1}\left(\sqrt{z}\right)$

01.28.27.1761.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi\,i}{2} - i\sec^{-1}\left(\sqrt{z}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.1762.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = i\sec^{-1}\left(\sqrt{z}\right) - \frac{\pi\,i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1763.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -i\sec^{-1}\left(\sqrt{z}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1764.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -\frac{\pi\sqrt{-z}}{2\sqrt{z}} - \frac{\sqrt{z-1}}{\sqrt{1-z}}\sec^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\sec^{-1}\left(\sqrt{z}\right)$

01.28.27.1765.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -i\sec^{-1}\left(\sqrt{z}\right) \;/;\; 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1766.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = i\sec^{-1}\left(\sqrt{z}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1767.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = -\frac{\sqrt{z-1}}{\sqrt{1-z}}\sec^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\sec^{-1}(\sqrt{z})$

01.28.27.1768.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -i\sec^{-1}(\sqrt{z}) \;/;\; \operatorname{Im}(z) \geq 0$$

01.28.27.1769.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = i\sec^{-1}(\sqrt{z}) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1770.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\sqrt{z}\sqrt{-\frac{1}{z}}\sec^{-1}(\sqrt{z})$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1771.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1772.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.1773.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1774.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -\frac{\sqrt{1-z}}{\sqrt{z-1}}\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{1}{2}\pi\sqrt{z}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1775.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1776.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1777.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1778.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = -\frac{\sqrt{1-z}}{\sqrt{-1+z}}\sqrt{z}\sqrt{\frac{1}{z}}\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1779.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.1780.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1781.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1782.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi\sqrt{1-z}\sqrt{-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}} - \frac{\sqrt{-z^2}}{z}\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1783.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0$$

01.28.27.1784.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi i}{2} - i \sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 1)$$

01.28.27.1785.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -i \sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.1786.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{1}{2} \pi \sqrt{\frac{1-z}{z}} \sqrt{\frac{1}{1-z}} \sqrt{-z} - \sqrt{-z} \sqrt{\frac{1}{z}} \sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1787.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i \sec^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.1788.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi i}{2} - i \sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.1789.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i \sec^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.1790.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\sqrt{z-1}}{\sqrt{1-z}} \sec^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1791.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = i \sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.1792.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\pi i}{2} - i \sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z < 0)$$

01.28.27.1793.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = -i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1794.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \frac{\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}}\sqrt{\frac{1}{z}}\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1795.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1796.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1797.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -\pi i + i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.1798.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right) + \frac{\sqrt{z-1}}{\sqrt{1-z}}\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1799.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1800.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = -i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1801.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \frac{\sqrt{z-1}\sqrt{z}}{\sqrt{1-z}}\sqrt{\frac{1}{z}}\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1802.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1803.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1804.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -\pi i + i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.1805.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right)\frac{\pi i}{2} - \frac{\sqrt{-z}}{\sqrt{z}}\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1806.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1807.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.1808.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -\sqrt{-z}\sqrt{\frac{1}{z}}\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.1809.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1810.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == -i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.1811.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == -\pi i + i\sec^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.1812.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right) + \frac{\sqrt{z}}{\sqrt{-z}}\sec^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.1813.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1814.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == -i\sec^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.1815.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == -\sqrt{-z}\sqrt{\frac{1}{z}}\sec^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z+a}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1816.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) == \frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.1817.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) == -\frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1818.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) == \frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1819.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) == \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}}-1\right) - \frac{\sqrt{1-z}}{2\sqrt{z-1}}\sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1820.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) == \frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1821.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) == -\frac{1}{2} i \sec^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.1822.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) == -\frac{1}{2} i \sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1823.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) == \frac{\sqrt{z-1}}{2\sqrt{1-z}}\sec^{-1}\left(\frac{1}{z}\right) - \frac{1}{2}\sqrt{z}\sqrt{-\frac{1}{z}}\,\pi$$

Involving $\coth^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-a-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1824.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) == \frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.1825.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) == -\frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.1826.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) == \frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1827.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) == -\frac{\pi i}{2}\left(1-\sqrt{z+1}\sqrt{\frac{1}{z+1}}\right) - \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1828.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\,i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1829.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2}\,i\sec^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.1830.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2}\,i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1831.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{\sqrt{-z-1}}{2\sqrt{z+1}}\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{-z}\,z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-a}{z+a}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1832.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.1833.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.1834.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{i}{2}\sec^{-1}\left(\frac{1}{z}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1835.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} - 1\right)\frac{\pi i}{2} - \frac{\sqrt{-1-z}}{2\sqrt{z+1}}\sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1836.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\,i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \le \pi \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1837.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{1}{2} i \sec^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.1838.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{1}{2} i \sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1839.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{\sqrt{1-z}}{2\sqrt{z-1}} \sec^{-1}\left(\frac{1}{z}\right) - \frac{1}{2} \pi \sqrt{z} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$ and $\sec^{-1}(z)$

01.28.27.1840.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi i}{2} - i \sec^{-1}(z) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1841.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = i \sec^{-1}(z) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1842.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = i \sec^{-1}(z) - \frac{3 \pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1843.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -i \sec^{-1}(z) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1844.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -\frac{1}{2} \pi \left(\frac{\sqrt{-z-1}}{\sqrt{z+1}} + \frac{\sqrt{z-1}}{\sqrt{1-z}} - \frac{\sqrt{z^2} \sqrt{z^2-1}}{z \sqrt{1-z^2}}\right) - \frac{\sqrt{z^2} \sqrt{z^2-1}}{z \sqrt{1-z^2}} \sec^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$ and $\sec^{-1}(z)$

01.28.27.1845.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i \sec^{-1}(z) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1846.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i\sec^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1847.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -i\sec^{-1}(z) + \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1848.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = i\sec^{-1}(z) - \pi i \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1849.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \frac{1}{2}\left(\frac{\sqrt{z^2-1}\, z}{\sqrt{z^2-z^4}} + \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\right)\pi - \frac{z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\sec^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$ and $\sec^{-1}(z)$

01.28.27.1850.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i\sec^{-1}(z) \;/;\; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1851.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i\sec^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1852.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -i\sec^{-1}(z) + \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1853.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = i\sec^{-1}(z) - \pi i \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1854.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -\frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1 - \frac{\sqrt{z^2}}{z}\right) - z\sqrt{-\frac{1}{z^2}}\sec^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$ and $\sec^{-1}(z)$

01.28.27.1855.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -i\sec^{-1}(z) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1856.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = i\sec^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1857.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\pi i + i\sec^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1858.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \pi i - i\sec^{-1}(z) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1859.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \frac{1}{2}\pi\left(\sqrt{z^2} - z\right)\sqrt{-\frac{1}{z^2}} - \sqrt{z^2}\sqrt{-\frac{1}{z^2}}\sec^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1860.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = i\sec^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1) \bigvee (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.1861.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -i\sec^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1862.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \pi i - i \sec^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1863.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\pi i + i \sec^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0) \bigvee (i z \in \mathbb{R} \land i z < 0)$$

01.28.27.1864.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}} \left(\frac{\pi}{2}\left(\sqrt{\frac{1}{z^2}}\, z - 1\right) + \sec^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1865.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = i \sec^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1866.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -i \sec^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \le \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1867.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = -\pi i + i \sec^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \le \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1868.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \pi i - i \sec^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1869.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\sqrt{z^2-1}}{\sqrt{1-z^2}} \left(\frac{\pi}{2}\left(\sqrt{z^2}\,\sqrt{\frac{1}{z^2}} - \frac{\sqrt{z^2}}{z}\right) + \frac{\sqrt{z^2}}{z} \sec^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1870.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = i \sec^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.1871.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -i \sec^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.28.27.1872.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -\pi i + i \sec^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.1873.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \pi i - i \sec^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.1874.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{-z}}{\sqrt{z}} - \sqrt{-z^2}\sqrt{\frac{1}{z^2}}\right) - \frac{\sqrt{-z}}{\sqrt{z}} \sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1875.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = i \sec^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.1876.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -i \sec^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.28.27.1877.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -\pi\, i + i \sec^{-1}\left(\frac{1}{z}\right) /;\ \frac{\pi}{2} \le \arg(z) \le \pi$$

01.28.27.1878.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \pi\, i - i \sec^{-1}\left(\frac{1}{z}\right) /;\ -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.1879.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{-z^2}}{z} - \sqrt{-z^2}\sqrt{\frac{1}{z^2}}\right) - \frac{\sqrt{-z^2}}{z} \sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1880.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = i \sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi\, i}{2} /;\ 0 < \arg(z) \le \frac{\pi}{2} \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.1881.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi\, i}{2} - i \sec^{-1}\left(\frac{1}{z}\right) /;\ \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1882.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i \sec^{-1}\left(\frac{1}{z}\right) + \frac{3\,\pi\, i}{2} /;\ (z \in \mathbb{R} \land z < -1)$$

01.28.27.1883.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -i \sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi\, i}{2} /;\ (z \in \mathbb{R} \land z > 1)$$

01.28.27.0022.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\frac{\pi}{2} - \sec^{-1}\left(\frac{1}{z}\right)\right) /;\ z \notin (-\infty, -1) \bigwedge z \notin (1, \infty)$$

01.28.27.1884.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi\, i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{i\sqrt{1-z^2}}{\sqrt{z^2-1}} - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right) - \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} \sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1885.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1886.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1887.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = i\sec^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1888.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1889.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2} - \frac{i\sqrt{z^2-z^4}}{z\sqrt{-1+z^2}}} - 1\right)\frac{\pi i}{2} - \frac{\sqrt{z^2-z^4}}{z\sqrt{z^2-1}}\sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1890.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1891.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1892.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = i\sec^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1893.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1894.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right)\frac{\pi i}{2} - \frac{\sqrt{-z}}{\sqrt{z}}\sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1895.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1896.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi i}{2} - i\sec^{-1}\left(\frac{1}{z}\right) \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1897.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = i\sec^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1898.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -i\sec^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1899.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} + \frac{i z\sqrt{-1+z^2}}{\sqrt{z^2-z^4}} - 1\right)\frac{\pi i}{2} + \frac{z\sqrt{-1+z^2}}{\sqrt{z^2-z^4}}\sec^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$ and $\sec^{-1}\left(\frac{i}{z}\right)$

01.28.27.1900.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right)$ and $\sec^{-1}\left(\frac{i}{z}\right)$

01.28.27.1901.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi i}{4} - \frac{i}{2}\sec^{-1}\left(\frac{i}{z}\right) \;/;\; 0 \leq \arg(z) < \frac{\pi}{2}$$

01.28.27.1902.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{3\pi i}{4} - \frac{i}{2}\sec^{-1}\left(\frac{i}{z}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1903.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi}{2}\left(\frac{i}{2} - \sqrt{-\frac{1}{z^2}}\, z\right) - \frac{i}{2}\sec^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right)$ and $\sec^{-1}\left(\frac{i}{z}\right)$

01.28.27.1904.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi i}{4} - \frac{1}{2}\, i \sec^{-1}\left(\frac{i}{z}\right) \;/;\; 0 \leq \arg(z) < \pi$$

01.28.27.1905.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{3\pi i}{4} - \frac{i}{2}\sec^{-1}\left(\frac{i}{z}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.1906.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{1}{2}\pi\left(\frac{i}{2}-\sqrt{-\frac{1}{z^2}}\,z\right)-\frac{1}{2}\,i\sec^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right)$ and $\sec^{-1}\left(\frac{i}{z}\right)$

01.28.27.1907.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = -\frac{i}{2}\sec^{-1}\left(\frac{i}{z}\right)+\frac{\pi i}{4}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right)$ and $\sec^{-1}(z)$

01.28.27.1908.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{\pi i}{2}+2\,i\sec^{-1}(z)\;/;\;0<\arg(z)\leq\frac{\pi}{2}$$

01.28.27.1909.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{\pi i}{2}-2\,i\sec^{-1}(z)\;/;\;-\frac{\pi}{2}<\arg(z)<0\bigvee(z\in\mathbb{R}\wedge z>1)$$

01.28.27.1910.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{3\pi i}{2}+2\,i\sec^{-1}(z)\;/;\;\frac{\pi}{2}<\arg(z)<\pi\bigvee(z\in\mathbb{R}\wedge z<-1)$$

01.28.27.1911.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{3\pi i}{2}-2\,i\sec^{-1}(z)\;/;\;-\pi<\arg(z)\leq-\frac{\pi}{2}$$

01.28.27.1912.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = i\pi\left(1-\frac{i\sqrt{z^2}}{2\sqrt{-z^2}}-\sqrt{\frac{z^2}{z^2-1}}\sqrt{\frac{z^2-1}{z^2}}+\frac{i\,z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\right)+\frac{2\,z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\sec^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right)$ and $\sec^{-1}(z)$

01.28.27.1913.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = 2\,i\sec^{-1}(z) - \pi\,i\,/;\, |z| > \sqrt{2}\bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.1914.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = \pi\,i - 2\,i\sec^{-1}(z)\,/;\, |z| > \sqrt{2}\bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.1915.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\left(\theta\left(\left|\sqrt{z^2-1}\right|-1\right)+\frac{\sqrt{z^2}}{z}-1\right)\pi - \frac{2\sqrt{z^2}}{z}\sec^{-1}(z)\right)$$

01.28.27.1916.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = -\frac{\pi}{2\sqrt{1-z^2}}\left(\left(z^2-2\right)\sqrt{\frac{z^4}{z^2-1}}\sqrt{\frac{z^2-1}{z^4}}\sqrt{\frac{z^2-1}{\left(z^2-2\right)^2}} - \sqrt{1-\frac{1}{z^2}}\,z\left(\sqrt{\frac{1}{z^2}}\,z - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + \sqrt{\frac{i}{z}}\sqrt{-i\,z} - \sqrt{-\frac{i}{z}}\sqrt{i\,z} + \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right)\right) - \frac{2\,z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\left(\frac{\pi}{2}-\sec^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1917.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi\,i}{2} - 2\,i\sec^{-1}\left(\frac{1}{z}\right)/;\, 0 < \arg(z) < \frac{\pi}{2}\bigvee\left(z\in\mathbb{R}\land 0<z<1\right)\bigvee\left(i\,z\in\mathbb{R}\land i\,z>0\right)$$

01.28.27.1918.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{\pi\,i}{2} + 2\,i\sec^{-1}\left(\frac{1}{z}\right)/;\, -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1919.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{3\pi i}{2} + 2i\sec^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1920.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{3\pi i}{2} - 2i\sec^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0) \bigvee (iz \in \mathbb{R} \land iz < 0)$$

01.28.27.1921.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} + 2i\sec^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1922.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{5\pi i}{2} + 2i\sec^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1923.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) =$$

$$\frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\frac{\pi}{2}\left(-\sqrt{\frac{1}{1-z}}\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\sqrt{z+1} - \sqrt{-iz}\sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}}\sqrt{iz} + \frac{\sqrt{z^2}}{z} - 2\right) + 2\sec^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$ and $\sec^{-1}\left(\frac{1}{z}\right)$

01.28.27.1924.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = \pi i - 2i\sec^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{4} \le \arg(z) \le \frac{\pi}{2} \bigvee -\frac{3\pi}{4} \le \arg(z) \le -\frac{\pi}{2}$$

01.28.27.1925.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\pi i + 2i\sec^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) \le \frac{3\pi}{4} \bigvee -\frac{\pi}{2} < \arg(z) \le -\frac{\pi}{4}$$

01.28.27.1926.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) == -\frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(2\sec^{-1}\left(\frac{1}{z}\right)+\frac{\pi}{2}\left(\frac{\sqrt{z^2-1}\,z}{\sqrt{z^4-z^2}}+\sqrt{\frac{1}{z}}\sqrt{\frac{1}{\sqrt{2}\,z-1}}\sqrt{\sqrt{2}\,z-1}\sqrt{z}-\sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{-\sqrt{2}\,z-1}\sqrt{-\frac{1}{\sqrt{2}\,z+1}}+\frac{\sqrt{z^2}}{z}-2\right)\right)$$

Involving $\sinh^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\frac{2z}{1-z^2}\right)$

01.28.27.1927.01

$$\coth^{-1}(z) == -\frac{\pi i}{2}+\frac{1}{2}\sinh^{-1}\left(\frac{2z}{1-z^2}\right) /; |z|<1 \bigwedge 0 \leq \arg(z) < \pi$$

01.28.27.1928.01

$$\coth^{-1}(z) == \frac{\pi i}{2}+\frac{1}{2}\sinh^{-1}\left(\frac{2z}{1-z^2}\right) /; |z|<1 \land \operatorname{Im}(z)<0 \lor (z \in \mathbb{R} \land -1<z<0)$$

01.28.27.1929.01

$$\coth^{-1}(z) == \frac{1}{2}\sinh^{-1}\left(\frac{2z}{1-z^2}\right)-\frac{\pi z}{2}\sqrt{-\frac{1}{z^2}} /; |z|<1$$

01.28.27.1930.01

$$\coth^{-1}(z) == -\frac{1}{2}\sinh^{-1}\left(\frac{2z}{1-z^2}\right) /; |z|>1$$

01.28.27.1931.01

$$\coth^{-1}(z) == \frac{1}{4}\pi\left(\frac{z-i}{z+i}\sqrt{\left(\frac{z+i}{z-i}\right)^2}-1\right)\sqrt{-\frac{1}{z^2}}\,z-\frac{z-i}{2(z+i)}\sqrt{\left(\frac{z+i}{z-i}\right)^2}\sinh^{-1}\left(\frac{2z}{1-z^2}\right) /; |z| \neq 1$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\frac{2z}{z^2-1}\right)$

01.28.27.1932.01

$$\coth^{-1}(z) == -\frac{\pi i}{2}-\frac{1}{2}\sinh^{-1}\left(\frac{2z}{z^2-1}\right) /; |z|<1 \bigwedge 0 \leq \arg(z) < \pi$$

01.28.27.1933.01

$$\coth^{-1}(z) == \frac{\pi i}{2}-\frac{1}{2}\sinh^{-1}\left(\frac{2z}{z^2-1}\right) /; |z|<1 \land \operatorname{Im}(z)<0 \lor (z \in \mathbb{R} \land -1<z<0)$$

01.28.27.1934.01

$$\coth^{-1}(z) == -\frac{1}{2}\sinh^{-1}\left(\frac{2z}{z^2-1}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}} \;/;\; |z| < 1$$

01.28.27.1935.01

$$\coth^{-1}(z) == \frac{1}{2}\sinh^{-1}\left(\frac{2z}{z^2-1}\right) \;/;\; |z| > 1$$

01.28.27.1936.01

$$\coth^{-1}(z) == \frac{z-i}{2(z+i)}\sqrt{\left(\frac{z+i}{z-i}\right)^2}\sinh^{-1}\left(\frac{2z}{z^2-1}\right) + \frac{\pi z}{4}\left(\frac{z-i}{z+i}\sqrt{\left(\frac{z+i}{z-i}\right)^2} - 1\right)\sqrt{-\frac{1}{z^2}} \;/;\; |z| \neq 1$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\frac{i(1+z^2)}{1-z^2}\right)$

01.28.27.1937.01

$$\coth^{-1}(z) == -\frac{\pi i}{4} - \frac{1}{2}\sinh^{-1}\left(\frac{i(1+z^2)}{1-z^2}\right) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1938.01

$$\coth^{-1}(z) == \frac{\pi i}{4} + \frac{1}{2}\sinh^{-1}\left(\frac{i(1+z^2)}{1-z^2}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1939.01

$$\coth^{-1}(z) == -\frac{3\pi i}{4} + \frac{1}{2}\sinh^{-1}\left(\frac{i(1+z^2)}{1-z^2}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1940.01

$$\coth^{-1}(z) == \frac{3\pi i}{4} - \frac{1}{2}\sinh^{-1}\left(\frac{i(1+z^2)}{1-z^2}\right) \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1941.01

$$\coth^{-1}(z) == \frac{1}{4} i\pi\left(i\sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right) - \frac{i\sqrt{-z^2}\sqrt{1-z^2}}{2z}\sqrt{\frac{1}{1-z^2}}\sinh^{-1}\left(\frac{i(1+z^2)}{1-z^2}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\frac{i(z^2+1)}{z^2-1}\right)$

01.28.27.1942.01

$$\coth^{-1}(z) == -\frac{\pi i}{4} + \frac{1}{2}\sinh^{-1}\left(\frac{i(z^2+1)}{z^2-1}\right) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.1943.01

$$\coth^{-1}(z) == \frac{\pi i}{4} - \frac{1}{2}\sinh^{-1}\left(\frac{i(z^2+1)}{z^2-1}\right) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.1944.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} - \frac{1}{2}\sinh^{-1}\left(\frac{i(z^2+1)}{z^2-1}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1945.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} + \frac{1}{2}\sinh^{-1}\left(\frac{i(z^2+1)}{z^2-1}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1946.01

$$\coth^{-1}(z) = \frac{1}{4} i \pi \left(i \sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} - \sqrt{1+\frac{1}{z}} \sqrt{\frac{z}{z+1}}\right) + \frac{i\sqrt{-z^2}\sqrt{1-z^2}}{2z} \sqrt{\frac{1}{1-z^2}} \sinh^{-1}\left(\frac{i(z^2+1)}{z^2-1}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right)$

01.28.27.1947.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1948.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1949.01

$$\coth^{-1}(z) = -\pi i - \sinh^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1950.01

$$\coth^{-1}(z) = \pi i + \sinh^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1951.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} - \sqrt{1+\frac{1}{z}} \sqrt{\frac{z}{z+1}}\right) + z\sqrt{\frac{1}{z^2}} \sqrt{z^2-1} \sqrt{\frac{1}{z^2-1}} \sinh^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right)$

01.28.27.1952.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right) /; -\frac{\pi}{2} \le \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1953.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1954.01

$$\coth^{-1}(z) = -\pi i + \sinh^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1955.01

$$\coth^{-1}(z) = \pi i - \sinh^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1956.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right) + z\sqrt{\frac{1}{z^2}}\sinh^{-1}\left(\sqrt{\frac{1}{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right)$

01.28.27.1957.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1958.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1959.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.1960.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.1961.01

$$\coth^{-1}(z) = \sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}}\sinh^{-1}\left(\frac{z}{\sqrt{1-z^2}}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right)$

01.28.27.1962.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1963.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1964.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1965.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1966.01

$$\coth^{-1}(z) = \frac{\sqrt{z^2}\sqrt{1-z^2}}{z} \sqrt{\frac{1}{1-z^2}} \sinh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{1-z^2}}\right) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right)$

01.28.27.1967.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1968.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1969.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z > 0)$$

01.28.27.1970.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.1971.01

$$\coth^{-1}(z) = \frac{z\sqrt{z^2-1}}{\sqrt{-z^2}} \sqrt{\frac{1}{1-z^2}} \sinh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{z^2-1}}\right) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right)$

01.28.27.1972.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) - \frac{\pi i}{2} /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1973.01

$$\coth^{-1}(z) = \sinh^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.1974.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.1975.01

$$\coth^{-1}(z) = -\sinh^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.1976.01

$$\coth^{-1}(z) = -z \sqrt{-\frac{1}{z^2}} \sqrt{\frac{1}{1-z^2}} \sqrt{z^2-1} \sinh^{-1}\left(\sqrt{\frac{z^2}{1-z^2}}\right) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{-\sqrt{1-z^2}-1} \Big/ \left(\sqrt{2}\,(1-z^2)^{1/4}\right)\right)$

01.28.27.1977.01

$$\coth^{-1}(z) = -2 \sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z^2}-1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} /; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.1978.01

$$\coth^{-1}(z) = -2 \sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z^2}-1}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right) - \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1979.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1980.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.1981.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z}\sqrt{z^2-1}}{\sqrt{z}\sqrt{1-z^2}}\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z^2}-1}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}} - \frac{i\sqrt{z}}{\sqrt{-z}}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{1-\sqrt{1-z^2}} \big/ \left(\sqrt{2}\,(1-z^2)^{1/4}\right)\right)$

01.28.27.1982.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1983.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1984.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1985.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\sqrt[4]{1-z^2}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1986.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(i\sqrt{-\frac{1}{z^2}}\, z - \sqrt{\frac{1}{1-z}}\,\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\,\sqrt{z+1}\right) + \frac{2\sqrt{z^2}}{z}\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\,\sqrt[4]{1-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{-\left(\sqrt{1-z^2}+1\right)/\left(2\sqrt{1-z^2}\right)}\right)$

01.28.27.1987.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} \;/;\; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.1988.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} \;/;\; -\frac{\pi}{2} \le \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1989.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} \;/;\; \frac{\pi}{2} \le \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1990.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.1991.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1992.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1993.01

$$\coth^{-1}(z) = 2z\sqrt{\frac{1}{z^2}}\,\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\,\sqrt{\frac{z}{z+1}} - \frac{i\sqrt{z}}{\sqrt{-z}}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{\left(1-\sqrt{1-z^2}\right)\Big/\left(2\sqrt{1-z^2}\right)}\right)$

01.28.27.1994.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} /;\ 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.1995.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} /;\ -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.1996.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} /;\ \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.1997.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.1998.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(i\sqrt{-\frac{1}{z^2}}\, z - \sqrt{\frac{1}{1-z}}\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\sqrt{z+1}\right) + \frac{2\sqrt{z^2}}{z}\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z^2}}{2\sqrt{1-z^2}}}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{-\sqrt{z^2-1}-z}\Big/\left(\sqrt{2}\,(z^2-1)^{1/4}\right)\right)$

01.28.27.1999.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\frac{\sqrt{-z-\sqrt{z^2-1}}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) - \pi i /;\ 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2000.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\frac{\sqrt{-z-\sqrt{z^2-1}}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) + \pi i /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2001.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\frac{\sqrt{-z-\sqrt{z^2-1}}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2002.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\frac{\sqrt{-z-\sqrt{z^2-1}}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2003.01

$$\coth^{-1}(z) = -2\sqrt{\frac{1}{1-z}}\sqrt{1-z}\sinh^{-1}\left(\frac{\sqrt{-z-\sqrt{z^2-1}}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) - \frac{\pi\left(z+\sqrt{z^2}\right)}{2\sqrt{z}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{z-\sqrt{z^2-1}} \Big/ \left(\sqrt{2}\,(z^2-1)^{1/4}\right)\right)$

01.28.27.2004.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\frac{\sqrt{z-\sqrt{z^2-1}}}{\sqrt{2}\left(z^2-1\right)^{1/4}}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2005.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\frac{\sqrt{z-\sqrt{z^2-1}}}{\sqrt{2}\left(z^2-1\right)^{1/4}}\right) - \pi i /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2006.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\frac{\sqrt{z-\sqrt{z^2-1}}}{\sqrt{2}\left(z^2-1\right)^{1/4}}\right) + \pi i /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2007.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\frac{\sqrt{z-\sqrt{z^2-1}}}{\sqrt{2}\sqrt[4]{z^2-1}}\right) + \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2008.01

$$\coth^{-1}(z) = \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1-\frac{\sqrt{z^2}}{z}\right)+2\sqrt{\frac{1}{1+z}}\sqrt{1+z}\,\sinh^{-1}\left(\frac{\sqrt{z-\sqrt{z^2-1}}}{\sqrt{2}\,(z^2-1)^{1/4}}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{-\left(\sqrt{z^2-1}+z\right)\Big/\left(2\sqrt{z^2-1}\right)}\right)$

01.28.27.2009.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{-\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)-\pi i\ /;\ 0\le\arg(z)\le\frac{\pi}{2}$$

01.28.27.2010.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{\frac{-z-\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)+\pi i\ /;\ -\frac{\pi}{2}<\arg(z)<0$$

01.28.27.2011.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{-\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)\ /;\ \mathrm{Re}(z)<0$$

01.28.27.2012.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{\frac{-z-\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)\ /;\ (i\,z\in\mathbb{R}\land i\,z>0)$$

01.28.27.2013.01

$$\coth^{-1}(z) = -\frac{1}{2}\pi\sqrt{-\frac{1}{z}}\sqrt{z}\left(\frac{\sqrt{z^2}}{z}+1\right)-2\,i\sqrt{\frac{i}{z}}\sqrt{i\,z}\,\sinh^{-1}\left(\sqrt{\frac{-z-\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}(z)$ and $\sinh^{-1}\left(\sqrt{\left(z-\sqrt{z^2-1}\right)\Big/\left(2\sqrt{z^2-1}\right)}\right)$

01.28.27.2014.01

$$\coth^{-1}(z) = 2\sinh^{-1}\left(\sqrt{\frac{z-\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)\ /;\ \mathrm{Re}(z)>0$$

01.28.27.2015.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{\frac{z-\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) - \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2016.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{\frac{z-\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) + \pi i \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2017.01

$$\coth^{-1}(z) = -2\sinh^{-1}\left(\sqrt{\frac{z-\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) \;/;\; (i\, z \in \mathbb{R} \land i\, z < 0)$$

01.28.27.2018.01

$$\coth^{-1}(z) = \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1-\frac{\sqrt{z^2}}{z}\right) + 2\, i\sqrt{-\frac{i}{z}}\sqrt{-i\, z}\,\sinh^{-1}\left(\sqrt{\frac{z-\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$

Involving $\coth^{-1}(\sqrt{z})$ and $\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right)$

01.28.27.2019.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2020.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right) + \frac{\pi i}{4} \;/;\; \mathrm{Im}(z) < 0$$

01.28.27.2021.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2022.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi i}{4}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + i\sqrt{z}\sqrt{-\frac{1}{z}} - 1\right) - \frac{i\sqrt{1-z}\sqrt{-z^2}}{2z}\sqrt{\frac{1}{1-z}}\,\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right)$

01.28.27.2023.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2024.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right) + \frac{\pi i}{4} \;/;\; \mathrm{Im}(z) < 0$$

01.28.27.2025.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2026.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{4}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + i\sqrt{z}\sqrt{-\frac{1}{z}} - 1\right) + \frac{i\sqrt{1-z}\sqrt{-z^2}}{2z}\sqrt{\frac{1}{1-z}}\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right)$

01.28.27.2027.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) - \frac{\pi i}{2} \;/;\; |z| < 1 \land \mathrm{Im}(z) \geq 0$$

01.28.27.2028.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) + \frac{\pi i}{2} \;/;\; |z| < 1 \land \mathrm{Im}(z) < 0$$

01.28.27.2029.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) - \frac{1}{2}\left(\pi\sqrt{z}\right)\sqrt{-\frac{1}{z}} \;/;\; |z| < 1$$

01.28.27.2030.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) /;\; |z| > 1$$

01.28.27.2031.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi\sqrt{z}}{4}\sqrt{-\frac{1}{z}}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) + \frac{1+z}{2(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) /;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right)$

01.28.27.2032.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) - \frac{\pi i}{2} \;/;\; |z| < 1 \land \mathrm{Im}(z) \geq 0$$

01.28.27.2033.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) + \frac{\pi i}{2} \;/;\; |z| < 1 \land \mathrm{Im}(z) < 0$$

01.28.27.2034.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) - \frac{1}{2}(\pi\sqrt{z})\sqrt{-\frac{1}{z}} \;/;\; |z| < 1$$

01.28.27.2035.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) \;/;\; |z| > 1$$

01.28.27.2036.01

$$\coth^{-1}(\sqrt{z}) = -\frac{\pi\sqrt{z}}{4}\sqrt{-\frac{1}{z}}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}+1\right) - \frac{1+z}{2(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right)$

01.28.27.2037.01

$$\coth^{-1}(\sqrt{z}) = \sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right) \;/;\; z \notin (0, 1)$$

01.28.27.2038.01

$$\coth^{-1}(\sqrt{z}) = -\sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2039.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - 1\right) + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right)$

01.28.27.2040.01

$$\coth^{-1}(\sqrt{z}) = \sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right) \;/;\; z \notin (-\infty, 1)$$

01.28.27.2041.01

$$\coth^{-1}(\sqrt{z}) = -\sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right) \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2042.01

$$\coth^{-1}(\sqrt{z}) = \sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2043.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - 1\right) - \frac{\sqrt{-z}\sqrt{1-z}}{\sqrt{z}}\sqrt{\frac{1}{-1+z}}\sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right)$

01.28.27.2044.01

$$\coth^{-1}(\sqrt{z}) = \sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2045.01

$$\coth^{-1}(\sqrt{z}) = \sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.2046.01

$$\coth^{-1}(\sqrt{z}) = -\sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2047.01

$$\coth^{-1}(\sqrt{z}) = \sqrt{\frac{1}{1-z}} \sqrt{1-z} \sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right)$

01.28.27.2048.01

$$\coth^{-1}(\sqrt{z}) = -\sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \le \pi$$

01.28.27.2049.01

$$\coth^{-1}(\sqrt{z}) = -\sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.2050.01

$$\coth^{-1}(\sqrt{z}) = \sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 0)$$

01.28.27.2051.01

$$\coth^{-1}(\sqrt{z}) = \frac{\sqrt{-1+z}}{\sqrt{-z}} \sqrt{\frac{z}{1-z}} \sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\sinh^{-1}\left(\sqrt{\frac{z}{1-z}}\right)$

01.28.27.2052.01

$$\coth^{-1}(\sqrt{z}) = \sinh^{-1}\left(\sqrt{\frac{z}{1-z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) \ge 0$$

01.28.27.2053.01

$$\coth^{-1}(\sqrt{z}) = \sinh^{-1}\left(\sqrt{\frac{z}{1-z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.2054.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sinh^{-1}\left(\sqrt{\frac{z}{1-z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\sqrt{-\sqrt{1-z}-1}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2055.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.2056.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2057.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2058.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \pi\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} + \frac{\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\sqrt{1-\sqrt{1-z}}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2059.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z}}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2060.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z}}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2061.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z}}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\sqrt{-\left(\sqrt{1-z}+1\right)\Big/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2062.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0$$

01.28.27.2063.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2064.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2065.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2066.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \pi\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} + \frac{\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\sqrt{\left(1-\sqrt{1-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2067.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z}}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2068.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2069.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z}}{2\sqrt{1-z}}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\sqrt{-\sqrt{1-z}-\sqrt{-z}}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2070.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \pi i /; 0 < \arg(z) \le \pi$$

01.28.27.2071.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z} - \sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) + \pi i \;/;\; \mathrm{Im}(z) < 0$$

01.28.27.2072.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z} - \sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2073.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z} - \sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2074.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(1 + 2 i \sqrt{z}\sqrt{-\frac{1}{z}} - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right) + 2\sqrt{1-z}\sqrt{\frac{1}{1-z}}\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z} - \sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\sqrt{\sqrt{-z} - \sqrt{1-z}} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2075.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{\sqrt{-z} - \sqrt{1-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) \;/;\; z \notin (-\infty, 1)$$

01.28.27.2076.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\frac{\sqrt{\sqrt{-z} - \sqrt{1-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2077.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\sinh^{-1}\left(\frac{\sqrt{\sqrt{-z} - \sqrt{1-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2078.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - 1\right)\frac{\pi i}{2} + 2\sqrt{\frac{1}{z}}\sqrt{z}\sinh^{-1}\left(\frac{\sqrt{\sqrt{-z} - \sqrt{1-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\sqrt{-\left(\sqrt{1-z} + \sqrt{-z}\right)\big/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2079.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z} + \sqrt{-z}}{2\sqrt{1-z}}}\right) - \pi i \;/;\; 0 < \arg(z) \le \pi \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2080.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) + \pi i\ /;\ \operatorname{Im}(z) < 0$$

01.28.27.2081.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)\ /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2082.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) + \left(1 + 2 i\sqrt{z}\sqrt{-\frac{1}{z}} - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right)\frac{\pi i}{2}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\sinh^{-1}\left(\sqrt{\left(\sqrt{-z}-\sqrt{1-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2083.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{\frac{\sqrt{-z}-\sqrt{1-z}}{2\sqrt{1-z}}}\right)\ /;\ z \notin (-\infty, 1)$$

01.28.27.2084.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sinh^{-1}\left(\sqrt{\frac{\sqrt{-z}-\sqrt{1-z}}{2\sqrt{1-z}}}\right) - \pi i\ /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2085.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\sinh^{-1}\left(\sqrt{\frac{\sqrt{-z}-\sqrt{1-z}}{2\sqrt{1-z}}}\right)\ /;\ (z \in \mathbb{R} \land z < 0)$$

01.28.27.2086.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - 1\right)\frac{\pi i}{2} + 2\sqrt{\frac{1}{z}}\sqrt{z}\sinh^{-1}\left(\sqrt{\frac{\sqrt{-z}-\sqrt{1-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right)$

01.28.27.2087.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right) + \frac{\pi i}{4}\ /;\ 0 < \arg(z) \leq \pi$$

01.28.27.2088.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right) - \frac{\pi i}{4} \;/;\; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2089.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2090.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right) - \frac{i\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\sinh^{-1}\left(\frac{i(1+z)}{1-z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right)$

01.28.27.2091.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right) + \frac{\pi i}{4} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.2092.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right) - \frac{\pi i}{4} \;/;\; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2093.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2094.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right) + \frac{i\sqrt{-z}\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\sinh^{-1}\left(\frac{i(z+1)}{z-1}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right)$

01.28.27.2095.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) \;/;\; |z| < 1$$

01.28.27.2096.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - \frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) \;/;\; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.2097.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{2} - \frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) \;/;\; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.2098.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) - \frac{\pi\sqrt{-z^2}}{2z} \;/;\; |z| > 1$$

01.28.27.2099.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == -\frac{\pi\sqrt{-z^2}}{4z}\left(1-\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right)+\frac{1+z}{2(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\sinh^{-1}\left(\frac{2\sqrt{z}}{1-z}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right)$

01.28.27.2100.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == -\frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) /; |z| < 1$$

01.28.27.2101.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == \frac{\pi i}{2}+\frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.2102.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == -\frac{\pi i}{2}+\frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.2103.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == \frac{1}{2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right)-\frac{\pi\sqrt{-z^2}}{2z} /; |z| > 1$$

01.28.27.2104.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == -\frac{\pi\sqrt{-z^2}}{4z}\left(1-\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right)-\frac{1+z}{2(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\sinh^{-1}\left(\frac{2\sqrt{z}}{z-1}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right)$

01.28.27.2105.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == \sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right)+\frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.2106.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == \sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right)-\frac{\pi i}{2} /; \mathrm{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2107.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == -\sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right)-\frac{\pi i}{2} /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.2108.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) == \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\sinh^{-1}\left(\frac{1}{\sqrt{z-1}}\right)-\frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right)$

01.28.27.2109.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.2110.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.2111.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2112.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{\frac{1}{z}}\,\sqrt{z}\,\sinh^{-1}\left(\sqrt{\frac{1}{z-1}}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right)$

01.28.27.2113.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right) \;/;\; z \notin (1, \infty)$$

01.28.27.2114.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2115.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - 1\right) + \sqrt{\frac{1}{1-z}}\,\sqrt{1-z}\,\sinh^{-1}\left(\frac{\sqrt{z}}{\sqrt{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right)$

01.28.27.2116.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right) \;/;\; z \notin (0, \infty)$$

01.28.27.2117.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2118.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right) - \pi i \,/;\, (z \in \mathbb{R} \land z > 1)$$

01.28.27.2119.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - 1\right)\frac{\pi i}{2} - \sqrt{-\frac{1}{z}}\,\sqrt{-z}\,\sinh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{z-1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{\frac{z}{1-z}}\right)$

01.28.27.2120.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sinh^{-1}\left(\sqrt{\frac{z}{1-z}}\right) \,/;\, z \notin (1, \infty)$$

01.28.27.2121.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sinh^{-1}\left(\sqrt{\frac{z}{1-z}}\right) - \pi i \,/;\, (z \in \mathbb{R} \land z > 1)$$

01.28.27.2122.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - 1\right) + \sinh^{-1}\left(\sqrt{\frac{z}{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{-\sqrt{1-z}-1} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2123.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) + \pi i \,/;\, 0 < \arg(z) \le \pi$$

01.28.27.2124.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \pi i \,/;\, \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2125.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \pi i \,/;\, (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2126.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\sqrt{\frac{z}{z-1}}\,\sqrt{\frac{z-1}{z}}\,\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{1-\sqrt{1-z}} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2127.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\frac{\sqrt{1-\sqrt{1-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{-\left(\sqrt{1-z}+1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2128.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right)+\pi\, i \;/;\; \operatorname{Im}(z)>0$$

01.28.27.2129.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right)-\pi\, i \;/;\; -\pi<\arg(z)\leq 0$$

01.28.27.2130.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right)+\pi\, i \;/;\; (z\in\mathbb{R}\land z<0)$$

01.28.27.2131.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\,\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right)-\frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{\left(1-\sqrt{1-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2132.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\sqrt{\frac{1-\sqrt{1-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{-\sqrt{1-z}-\sqrt{-z}}\;/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2133.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right)-\frac{\pi\, i}{2} \;/;\; 0<\arg(z)\leq\pi$$

01.28.27.2134.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right)+\frac{\pi\, i}{2} \;/;\; \operatorname{Im}(z)<0\lor(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.2135.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2136.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{1-z}\sqrt{\frac{1}{1-z}}\sinh^{-1}\left(\frac{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) + \left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{i\sqrt{-z^2}}{2z} - 1\right)\pi i$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{\sqrt{-z}-\sqrt{1-z}} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2137.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\frac{\sqrt{\sqrt{-z}-\sqrt{1-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0$$

01.28.27.2138.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\frac{\sqrt{\sqrt{-z}-\sqrt{1-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq 0$$

01.28.27.2139.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\sinh^{-1}\left(\frac{\sqrt{\sqrt{-z}-\sqrt{1-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \wedge z < 0)$$

01.28.27.2140.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\sinh^{-1}\left(\frac{\sqrt{\sqrt{-z}-\sqrt{1-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{-\left(\sqrt{1-z}+\sqrt{-z}\right)\Big/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2141.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.2142.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.2143.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2144.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{-z^2}}{z}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) + 2\sinh^{-1}\left(\sqrt{-\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{\left(\sqrt{-z}-\sqrt{1-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2145.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\sqrt{\frac{\sqrt{-z}-\sqrt{1-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0$$

01.28.27.2146.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sinh^{-1}\left(\sqrt{\frac{\sqrt{-z}-\sqrt{1-z}}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \le 0$$

01.28.27.2147.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\sinh^{-1}\left(\sqrt{\frac{\sqrt{-z}-\sqrt{1-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2148.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\sinh^{-1}\left(\sqrt{\frac{\sqrt{-z}-\sqrt{1-z}}{2\sqrt{1-z}}}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\sqrt{1+z}\right)$

Involving $\coth^{-1}\left(\sqrt{1+z}\right)$ and $\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2149.01

$$\coth^{-1}\left(\sqrt{1+z}\right) = \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; z \notin (-1, 0)$$

01.28.27.2150.01

$$\coth^{-1}\left(\sqrt{1+z}\right) = -\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2151.01

$$\coth^{-1}\left(\sqrt{1+z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}} - 1\right) + \frac{\sqrt{z}\sqrt{-z-1}}{\sqrt{-z}\sqrt{z+1}}\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\tanh^{-1}\left(\frac{1}{\sqrt{1+z}}\right)$ and $\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2152.01

$$\tanh^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi$$

01.28.27.2153.01

$$\tanh^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2154.01

$$\tanh^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2155.01

$$\tanh^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} - 1\right) - \frac{\sqrt{-z} \sqrt{-1-z}}{\sqrt{1+z}} \sqrt{\frac{1}{z}} \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right)$ and $\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2156.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = \frac{\pi i}{2} + \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.2157.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\frac{\pi i}{2} + \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.2158.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\frac{\pi i}{2} - \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2159.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\frac{\sqrt{-z-1} \sqrt{-z}}{\sqrt{z+1} \sqrt{z}} \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi \sqrt{-z-1}}{2 \sqrt{z+1}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right)$ and $\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2160.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = \frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.2161.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; -\pi < \arg(z) \leq 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2162.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = \frac{\pi i}{2} - \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2163.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\frac{\sqrt{-z-1}\,\sqrt{-z}}{\sqrt{1+z}}\sqrt{\frac{1}{z}}\,\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right)$ and $\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2164.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = \frac{\pi i}{2} + \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.2165.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = -\frac{\pi i}{2} + \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.2166.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = -\frac{\pi i}{2} - \sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2167.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = -\frac{\sqrt{-z-1}\,\sqrt{-z}}{\sqrt{z}}\sqrt{\frac{1}{z+1}}\,\sinh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi}{2}\sqrt{-z-1}\,\sqrt{\frac{1}{z+1}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right)$ and $\sinh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2168.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = \frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.2169.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = -\frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) \leq 0$$

01.28.27.2170.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) == \sinh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$ and $\sinh^{-1}\left(\sqrt{z}\right)$

01.28.27.2171.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) == \sinh^{-1}\left(\sqrt{z}\right) /;\ z \notin (-\infty, -1)$$

01.28.27.2172.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) == \sinh^{-1}\left(\sqrt{z}\right) - \pi\, i /;\ (z \in \mathbb{R} \land z < -1)$$

01.28.27.2173.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) == \sinh^{-1}\left(\sqrt{z}\right) + \frac{\pi\, i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$ and $\sinh^{-1}\left(\sqrt{z}\right)$

01.28.27.2174.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) == \sinh^{-1}\left(\sqrt{z}\right) /;\ |\arg(z)| < \pi$$

01.28.27.2175.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) == \sinh^{-1}\left(\sqrt{z}\right) - \pi\, i /;\ (z \in \mathbb{R} \land z < -1)$$

01.28.27.2176.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) == -\sinh^{-1}\left(\sqrt{z}\right) /;\ (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2177.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) == \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\ \sinh^{-1}\left(\sqrt{z}\right) + \frac{\pi\, i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$ and $\sinh^{-1}\left(\sqrt{z}\right)$

01.28.27.2178.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \sinh^{-1}\left(\sqrt{z}\right) /; |\arg(z)| < \pi$$

01.28.27.2179.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \sinh^{-1}\left(\sqrt{z}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2180.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = -\sinh^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2181.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \sinh^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2}\left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$ and $\sinh^{-1}\left(\sqrt{z}\right)$

01.28.27.2182.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = -\frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) \geq 0$$

01.28.27.2183.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.2184.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \sinh^{-1}\left(\sqrt{z}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$ and $\sinh^{-1}\left(\sqrt{z}\right)$

01.28.27.2185.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = -\frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{z}\right) /; 0 \leq \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2186.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.2187.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \frac{\pi i}{2} - \sinh^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2188.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \sinh^{-1}\left(\sqrt{z}\right) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} \sqrt{z+1} \sqrt{\frac{1}{z+1}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$ and $\sinh^{-1}\left(\sqrt{z}\right)$

01.28.27.2189.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = -\frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) \geq 0$$

01.28.27.2190.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi i}{2} + \sinh^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.2191.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \sinh^{-1}\left(\sqrt{z}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z+a}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$ and $\sinh^{-1}(i z)$

01.28.27.2192.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = -\frac{1}{2} \sinh^{-1}(i z) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.2193.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2}\sinh^{-1}(i z) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2194.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = -\frac{1}{2}\sinh^{-1}(i z) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2195.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + \frac{i\sqrt{1-z}}{2\sqrt{z-1}} - 1\right) - \frac{i\sqrt{1-z}}{2\sqrt{z-1}}\sinh^{-1}(i z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$ and $\sinh^{-1}(i z)$

01.28.27.2196.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = -\frac{1}{2}\sinh^{-1}(i z) - \frac{\pi i}{4} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2197.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2}\sinh^{-1}(i z) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0$$

01.28.27.2198.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2}\sinh^{-1}(i z) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2199.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} - \sqrt{z}\sqrt{-\frac{1}{z}}\right) + \frac{i\sqrt{z-1}}{2\sqrt{1-z}}\sinh^{-1}(i z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-a-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$ and $\sinh^{-1}(i z)$

01.28.27.2200.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{1}{2}\sinh^{-1}(i z) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0$$

01.28.27.2201.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\sinh^{-1}(i z) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.2202.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{1}{2}\sinh^{-1}(i\,z) - \frac{3\,\pi\,i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2203.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{\pi\,i}{4}\left(\sqrt{z+1}\,\sqrt{\frac{1}{z+1}} + i\,\sqrt{-z}\,\sqrt{\frac{1}{z}} - 1\right) - \frac{i\,\sqrt{-z-1}}{2\,\sqrt{z+1}}\sinh^{-1}(i\,z)$$

01.28.27.2204.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{i\,\sqrt{-z-1}}{2\,\sqrt{z+1}}\sinh^{-1}(i\,z) - \frac{\pi\,i}{2}\left(1 - \frac{i\,\sqrt{-z-1}}{2\,\sqrt{z+1}} - \sqrt{z+1}\,\sqrt{\frac{1}{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$ and $\sinh^{-1}(i\,z)$

01.28.27.2205.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2}\sinh^{-1}(i\,z) - \frac{\pi\,i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.2206.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\sinh^{-1}(i\,z) + \frac{\pi\,i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.2207.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\sinh^{-1}(i\,z) - \frac{3\,\pi\,i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2208.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{i\,\sqrt{-z-1}}{2\,\sqrt{z+1}}\sinh^{-1}(i\,z) - \frac{\pi}{2}\left(\frac{\sqrt{-z}\,z\,\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\,\sqrt{-\frac{1}{z}} + \frac{\sqrt{-z-1}}{2\,\sqrt{z+1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-a}{z+a}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$ and $\sinh^{-1}(i\,z)$

01.28.27.2209.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{1}{2}\sinh^{-1}(i\,z) + \frac{\pi\,i}{4} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.2210.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\sinh^{-1}(i\,z) - \frac{\pi\,i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.2211.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{1}{2}\sinh^{-1}(i\,z) - \frac{3\,\pi\,i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2212.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{\pi\,i}{2}\left(\sqrt{z+1}\,\sqrt{\frac{1}{z+1}} + \frac{i\,\sqrt{-z-1}}{2\,\sqrt{z+1}} - 1\right) - \frac{i\,\sqrt{-z-1}}{2\,\sqrt{z+1}}\sinh^{-1}(i\,z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$ and $\sinh^{-1}(i\,z)$

01.28.27.2213.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{1}{2}\sinh^{-1}(i\,z) - \frac{\pi\,i}{4} \;/;\; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2214.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\sinh^{-1}(i\,z) + \frac{\pi\,i}{4} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.2215.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\sinh^{-1}(i\,z) - \frac{3\,\pi\,i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2216.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{\pi\,i}{4}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} + i\,\sqrt{z}\,\sqrt{-\frac{1}{z}} - 1\right) - \frac{i\,\sqrt{1-z}}{2\,\sqrt{z-1}}\sinh^{-1}(i\,z)$$

Involving $\coth^{-1}\left(\sqrt{1+z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{1+z^2}\right)$ and $\sinh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2217.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = \sinh^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Re}(z) > 0 \lor (i\,z \in \mathbb{R} \land i\,z < -1)$$

01.28.27.2218.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = -\sinh^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Re}(z) < 0 \lor (i\,z \in \mathbb{R} \land i\,z > 1)$$

01.28.27.2219.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = -\sinh^{-1}\left(\frac{1}{z}\right) - \pi\,i \;/;\; (i\,z \in \mathbb{R} \land -1 < i\,z < 0)$$

01.28.27.2220.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = \sinh^{-1}\left(\frac{1}{z}\right) - \pi\,i \;/;\; (i\,z \in \mathbb{R} \land 0 < i\,z < 1)$$

01.28.27.2221.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = -\frac{\pi}{2}\left(\frac{\sqrt{-i z-1}}{\sqrt{i z+1}}+\frac{\sqrt{i z-1}}{\sqrt{1-i z}}\right)-\frac{\sqrt{-z^2}\sqrt{-z^2-1}}{z\sqrt{z^2+1}}\sinh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right)$ and $\sinh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2222.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = \sinh^{-1}\left(\frac{1}{z}\right)+\frac{\pi i}{2} /; 0<\arg(z)<\frac{\pi}{2} \bigvee (i z\in\mathbb{R}\land i z<-1)$$

01.28.27.2223.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = \sinh^{-1}\left(\frac{1}{z}\right)-\frac{\pi i}{2} /; -\frac{\pi}{2}<\arg(z)\leq 0 \bigvee (i z\in\mathbb{R}\land 0<i z<1)$$

01.28.27.2224.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = -\sinh^{-1}\left(\frac{1}{z}\right)-\frac{\pi i}{2} /; \frac{\pi}{2}<\arg(z)\leq \pi \bigvee (i z\in\mathbb{R}\land -1<i z<0)$$

01.28.27.2225.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = -\sinh^{-1}\left(\frac{1}{z}\right)+\frac{\pi i}{2} /; -\pi<\arg(z)<-\frac{\pi}{2} \bigvee (i z\in\mathbb{R}\land i z>1)$$

01.28.27.2226.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = \frac{z\sqrt{-z^2-1}}{\sqrt{-z^4-z^2}}\sinh^{-1}\left(\frac{1}{z}\right)+\frac{\pi\sqrt{z^2+1}}{2\sqrt{-z^2-1}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right)$ and $\sinh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2227.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = \sinh^{-1}\left(\frac{1}{z}\right)+\frac{\pi i}{2} /; 0<\arg(z)<\frac{\pi}{2}$$

01.28.27.2228.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = \sinh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.28.27.2229.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = -\sinh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.2230.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = -\sinh^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2231.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = z\sqrt{\frac{1}{z^2}}\,\sinh^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{-z^2}}{2}\sqrt{\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right)$ and $\sinh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2232.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = -\frac{\pi i}{2} + \sinh^{-1}\left(\frac{1}{z}\right) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee -\frac{\pi}{2} < \arg(z) \leq 0 \bigvee (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.2233.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi i}{2} + \sinh^{-1}\left(\frac{1}{z}\right) \;/;\; 0 < \arg(z) < \frac{\pi}{2} \bigvee \frac{\pi}{2} < \arg(z) \leq \pi \bigvee (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.2234.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi i}{2} - \sinh^{-1}\left(\frac{1}{z}\right) \;/;\; (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.2235.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = -\frac{\pi i}{2} - \sinh^{-1}\left(\frac{1}{z}\right) \;/;\; (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.2236.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\sqrt{z^2}\,\sqrt{-z^2-1}}{\sqrt{-z^2\,(z^2+1)}}\sinh^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{-z^2-1}}{2\,z}\sqrt{\frac{z^2}{z^2+1}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$ and $\sinh^{-1}(z)$

01.28.27.2237.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = -\frac{\pi\,i}{2} + \sinh^{-1}(z) \;/;\; 0 \leq \arg(z) < \pi$$

01.28.27.2238.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \frac{\pi\,i}{2} + \sinh^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.0023.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \sinh^{-1}(z) - \frac{\pi\,z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$ and $\sinh^{-1}(z)$

01.28.27.2239.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\frac{\pi\,i}{2} + \sinh^{-1}(z) \;/;\; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2240.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\pi\,i}{2} + \sinh^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2241.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\pi\,i}{2} - \sinh^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2242.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\frac{\pi i}{2} - \sinh^{-1}(z) \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2243.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{z}{\sqrt{z^2}} \sinh^{-1}(z) - \frac{\pi\sqrt{z^2}}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right)$ and $\sinh^{-1}(z)$

01.28.27.2244.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = -\frac{\pi i}{2} + \sinh^{-1}(z) \;/;\; 0 \leq \arg(z) < \frac{\pi}{2} \bigvee (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.2245.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = \frac{\pi i}{2} + \sinh^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.2246.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = \frac{\pi i}{2} - \sinh^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.2247.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = -\frac{\pi i}{2} - \sinh^{-1}(z) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0) \bigvee (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.2248.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = \frac{\sqrt{z}\sqrt{-z^2-1}}{\sqrt{-z}\sqrt{z^2+1}} \sinh^{-1}(z) + \frac{\pi\sqrt{-z^2}\sqrt{-z^2-1}}{2\sqrt{z^2+1}}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$ and $\sinh^{-1}(z)$

01.28.27.2249.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = -\frac{\pi i}{2} + \sinh^{-1}(z) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2250.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi i}{2} + \sinh^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2251.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi i}{2} - \sinh^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2252.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = -\frac{\pi i}{2} - \sinh^{-1}(z) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2253.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\sqrt{z^2}}{z} \sinh^{-1}(z) - \frac{\pi \sqrt{z^2}}{2} \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$ and $\sinh^{-1}(z)$

01.28.27.2254.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \sinh^{-1}(z) /; i z \notin (-\infty, -1) \bigwedge i z \notin (1, \infty)$$

01.28.27.2255.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \sinh^{-1}(z) - \pi i /; (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.2256.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \sinh^{-1}(z) + \pi i /; (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.0024.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \sinh^{-1}(z) /; i z \notin (-\infty, -1) \bigwedge i z \notin (1, \infty)$$

01.28.27.0025.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \sinh^{-1}(z) + \frac{\pi i}{2}\left(\sqrt{\frac{1}{i z+1}} \sqrt{i z+1} - \sqrt{\frac{1}{1-i z}} \sqrt{1-i z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$ and $\sinh^{-1}(z)$

01.28.27.2257.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = \sinh^{-1}(z) \;/;\; \operatorname{Re}(z) > 0 \lor (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.2258.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = -\sinh^{-1}(z) \;/;\; \operatorname{Re}(z) < 0 \lor (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.2259.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = \sinh^{-1}(z) - \pi i \;/;\; (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.2260.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = -\sinh^{-1}(z) - \pi i \;/;\; (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.2261.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{\sqrt{z^2}}\right) = \frac{\pi i}{2}\left(\sqrt{z^2+1} \sqrt{\frac{1}{z^2+1}} - 1\right) + \frac{\sqrt{z^2}}{z} \sinh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right)$ and $\sinh^{-1}(z)$

01.28.27.2262.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \sinh^{-1}(z) \;/;\; \operatorname{Re}(z) > 0 \lor (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.2263.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = -\sinh^{-1}(z) \;/;\; \mathrm{Re}(z) < 0 \lor (i\,z \in \mathbb{R} \land -1 < i\,z < 0)$$

01.28.27.2264.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \sinh^{-1}(z) - \pi\,i \;/;\; (i\,z \in \mathbb{R} \land i\,z < -1)$$

01.28.27.2265.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = -\sinh^{-1}(z) - \pi\,i \;/;\; (i\,z \in \mathbb{R} \land i\,z > 1)$$

01.28.27.2266.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \frac{\pi\,i}{2}\left(\sqrt{1+z^2}\,\sqrt{\frac{1}{1+z^2}} - 1\right) + \frac{\sqrt{-z^2-z^4}}{z\,\sqrt{-1-z^2}}\sinh^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$ and $\sinh^{-1}(z)$

01.28.27.2267.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \sinh^{-1}(z) \;/;\; \mathrm{Re}(z) > 0 \lor (i\,z \in \mathbb{R} \land 0 < i\,z < 1)$$

01.28.27.2268.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = -\sinh^{-1}(z) \;/;\; \mathrm{Re}(z) < 0 \lor (i\,z \in \mathbb{R} \land -1 < i\,z < 0)$$

01.28.27.2269.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \sinh^{-1}(z) - \pi\,i \;/;\; (i\,z \in \mathbb{R} \land i\,z < -1)$$

01.28.27.2270.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = -\sinh^{-1}(z) - \pi\,i \;/;\; (i\,z \in \mathbb{R} \land i\,z > 1)$$

01.28.27.2271.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi i}{2}\left(\sqrt{z^2+1}\sqrt{\frac{1}{z^2+1}}-1\right) + \frac{\sqrt{z}\sqrt{-z^2-1}}{\sqrt{-z}\sqrt{z^2+1}}\sinh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$ and $\sinh^{-1}(z)$

01.28.27.2272.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = \frac{1}{2}\sinh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right)$ and $\sinh^{-1}(z)$

01.28.27.2273.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi i}{2} + \frac{1}{2}\sinh^{-1}(z) \;/;\; 0 \le \arg(z) < \pi$$

01.28.27.2274.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi i}{2} + \frac{1}{2}\sinh^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.2275.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z + \frac{1}{2}\sinh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right)$ and $\sinh^{-1}(z)$

01.28.27.2276.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi i}{2} + \frac{1}{2}\sinh^{-1}(z) \;/;\; 0 \le \arg(z) < \pi$$

01.28.27.2277.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{\pi i}{2} + \frac{1}{2}\sinh^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.2278.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z + \frac{1}{2}\sinh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right)$ and $\sinh^{-1}(z)$

01.28.27.2279.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = \frac{1}{2}\sinh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right)$ and $\sinh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2280.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = \frac{\pi i}{2} + 2\sinh^{-1}\left(\frac{1}{z}\right) \;/;\; 0 < \arg(z) < \frac{\pi}{2} \bigvee (i\, z \in \mathbb{R} \land i\, z < -1)$$

01.28.27.2281.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = -\frac{\pi i}{2} + 2\sinh^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) \le 0$$

01.28.27.2282.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = -\frac{\pi i}{2} - 2\sinh^{-1}\left(\frac{1}{z}\right) \;/;\; \frac{\pi}{2} < \arg(z) \le \pi$$

01.28.27.2283.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = \frac{\pi i}{2} - 2\sinh^{-1}\left(\frac{1}{z}\right) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (i\, z \in \mathbb{R} \land i\, z > 1)$$

01.28.27.2284.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = -\frac{3\pi i}{2} - 2\sinh^{-1}\left(\frac{1}{z}\right) \;/;\; (i\, z \in \mathbb{R} \land -1 < i\, z < 0)$$

01.28.27.2285.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = -\frac{3\pi i}{2} + 2\sinh^{-1}\left(\frac{1}{z}\right) /; (i z \in \mathbb{R} \wedge 0 < i z < 1)$$

01.28.27.2286.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = \left(\sqrt{\frac{z^2}{z^2+1}}\sqrt{\frac{z^2+1}{z^2}} + \frac{i\sqrt{-z^2}}{2\sqrt{z^2}} - 1\right)\pi i + \frac{2z}{\sqrt{z^2+1}}\sqrt{1+\frac{1}{z^2}}\sinh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right)$

Involving $\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right)$ and $\sinh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2287.01

$$\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right) = 2\sinh^{-1}\left(\frac{1}{z}\right) /; |z| > \sqrt{2} \bigwedge -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.28.27.2288.01

$$\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right) = -2\sinh^{-1}\left(\frac{1}{z}\right) /; |z| > \sqrt{2} \bigwedge \left(\frac{\pi}{2} < \arg(z) \le \pi \bigvee -\pi < \arg(z) \le -\frac{\pi}{2}\right)$$

01.28.27.2289.01

$$\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right) = \frac{\sqrt{z^2+1}}{\sqrt{-z^2-1}}\left(\frac{2\sqrt{-z^2}}{z}\sinh^{-1}\left(\frac{1}{z}\right) - \left(\theta\left(\left|\sqrt{-z^2-1}\right| - 1\right) - 1\right)\pi\right)$$

01.28.27.2290.01

$$\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right) =$$

$$\frac{\pi}{2\sqrt{z^2+1}}\left(-i z\sqrt{1+\frac{1}{z^2}}\left(i\sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{1}{z}}\sqrt{z} - \sqrt{\frac{z}{i+z}}\sqrt{\frac{i+z}{z}} - \sqrt{-\frac{1}{z}}\sqrt{-z} + \sqrt{\frac{-i+z}{z}}\sqrt{\frac{z}{-i+z}}\right) - \right.$$

$$\left.(z^2+2)\sqrt{-\frac{z^2+1}{z^4}}\sqrt{-\frac{z^4}{z^2+1}}\sqrt{-\frac{z^2+1}{(z^2+2)^2}}\right) + \frac{2z}{\sqrt{z^2+1}}\sqrt{1+\frac{1}{z^2}}\sinh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2+1}}{1+2z^2}\right)$

Involving $\coth^{-1}\left(\frac{2 z \sqrt{z^2+1}}{1+2 z^2}\right)$ and $\sinh^{-1}(z)$

01.28.27.2291.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2+1}}{1+2 z^2}\right) = -\frac{\pi i}{2} + 2 \sinh^{-1}(z) /; 0 \leq \arg(z) < \frac{\pi}{2} \bigvee \frac{\pi}{2} < \arg(z) < \pi \bigvee (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.2292.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2+1}}{1+2 z^2}\right) = \frac{\pi i}{2} + 2 \sinh^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (i z \in \mathbb{R} \land 0 < i z < 1) \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2293.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2+1}}{1+2 z^2}\right) = -\frac{3 \pi i}{2} + 2 \sinh^{-1}(z) /; (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.2294.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2+1}}{1+2 z^2}\right) = \frac{3 \pi i}{2} + 2 \sinh^{-1}(z) /; (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.2295.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2+1}}{1+2 z^2}\right) = \frac{\pi i}{2} \left(i \sqrt{-\frac{1}{z^2}}\, z - \sqrt{1 - i z} \sqrt{\frac{1}{1 - i z}} + \sqrt{\frac{1}{i z + 1}} \sqrt{i z + 1}\right) + 2 \sinh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{1+2 z^2}{2 z \sqrt{z^2+1}}\right)$

Involving $\coth^{-1}\left(\frac{1+2 z^2}{2 z \sqrt{z^2+1}}\right)$ and $\sinh^{-1}(z)$

01.28.27.2296.01

$$\coth^{-1}\left(\frac{1+2 z^2}{2 z \sqrt{z^2+1}}\right) = 2 \sinh^{-1}(z) /; -\frac{\pi}{4} \leq \arg(z) \leq \frac{\pi}{4} \bigvee \frac{3 \pi}{4} \leq \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{3 \pi}{4}$$

01.28.27.2297.01

$$\coth^{-1}\left(\frac{1+2 z^2}{2 z \sqrt{z^2+1}}\right) = \frac{\pi i}{2} \left(-\frac{i \sqrt{-z^2}}{z} + \sqrt{-\frac{i}{z}} \sqrt{i z} \sqrt{\frac{1}{i \sqrt{2}\, z - 1}} \sqrt{i \sqrt{2}\, z - 1} - \sqrt{\frac{i}{z}} \sqrt{-i z} \sqrt{-i \sqrt{2}\, z - 1} \sqrt{-\frac{1}{\sqrt{2}\, i z + 1}} + \frac{i z \sqrt{-z^2 - 1}}{\sqrt{z^4 + z^2}}\right) + 2 \sinh^{-1}(z)$$

Involving $\cosh^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\frac{2 i z}{1-z^2}\right)$

01.28.27.2298.01

$$\coth^{-1}(z) = \frac{\pi i}{4} + \frac{1}{2} \cosh^{-1}\left(\frac{2 i z}{1-z^2}\right) /; |z| < 1 \bigwedge -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee |z| > 1 \land \operatorname{Re}(z) > 0$$

01.28.27.2299.01

$$\coth^{-1}(z) = \frac{\pi i}{4} - \frac{1}{2} \cosh^{-1}\left(\frac{2 i z}{1-z^2}\right) /; |z| < 1 \bigwedge -\pi < \arg(z) < -\frac{\pi}{2} \bigvee |z| > 1 \land \operatorname{Re}(z) \leq 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2300.01

$$\coth^{-1}(z) = -\frac{3 \pi i}{4} + \frac{1}{2} \cosh^{-1}\left(\frac{2 i z}{1-z^2}\right) /; |z| < 1 \bigwedge 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2301.01

$$\coth^{-1}(z) = -\frac{3 \pi i}{4} - \frac{1}{2} \cosh^{-1}\left(\frac{2 i z}{1-z^2}\right) /; |z| < 1 \bigwedge \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2302.01

$$\coth^{-1}(z) = \frac{1}{4} \pi \left(\frac{z-i}{z+i} \left(i + \sqrt{-\frac{1}{z^2}}\, z\right) \sqrt{\left(\frac{z+i}{z-i}\right)^2} - \sqrt{-\frac{1}{z^2}}\, z\right) + \frac{\sqrt{i z} \sqrt{z} \sqrt{-z^2-1}}{2 \sqrt{-z} \sqrt{z^2+1}} \sqrt{-\frac{i}{z}} \cosh^{-1}\left(\frac{2 i z}{1-z^2}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\frac{2 i z}{z^2-1}\right)$

01.28.27.2303.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} + \frac{1}{2} \cosh^{-1}\left(\frac{2 i z}{z^2-1}\right) /; |z| < 1 \bigwedge 0 \leq \arg(z) < \frac{\pi}{2} \bigvee |z| > 1 \land \operatorname{Re}(z) \geq 0$$

01.28.27.2304.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} - \frac{1}{2} \cosh^{-1}\left(\frac{2 i z}{z^2-1}\right) /; |z| < 1 \bigwedge \frac{\pi}{2} \leq \arg(z) < \pi \bigvee |z| > 1 \land \operatorname{Re}(z) < 0$$

01.28.27.2305.01

$$\coth^{-1}(z) = \frac{3 \pi i}{4} - \frac{1}{2} \cosh^{-1}\left(\frac{2 i z}{z^2-1}\right) /; |z| < 1 \bigwedge -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2306.01

$$\coth^{-1}(z) = \frac{3 \pi i}{4} + \frac{1}{2} \cosh^{-1}\left(\frac{2 i z}{z^2-1}\right) /; |z| < 1 \bigwedge -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2307.01

$$\coth^{-1}(z) = \frac{\pi}{4} \left(-z \sqrt{-\frac{1}{z^2}} + \frac{z-i}{z+i} \left(-i + \sqrt{-\frac{1}{z^2}}\, z\right) \sqrt{\left(\frac{z+i}{z-i}\right)^2}\right) - \frac{1}{2} i \sqrt{\frac{z^2}{z^2+1}} \sqrt{i z - 1} \sqrt{\frac{i z + 1}{z^2}} \cosh^{-1}\left(\frac{2 i z}{z^2-1}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\frac{1+z^2}{1-z^2}\right)$

01.28.27.2308.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + \frac{1}{2}\cosh^{-1}\left(\frac{1+z^2}{1-z^2}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2309.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + \frac{1}{2}\cosh^{-1}\left(\frac{1+z^2}{1-z^2}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2310.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - \frac{1}{2}\cosh^{-1}\left(\frac{1+z^2}{1-z^2}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2311.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - \frac{1}{2}\cosh^{-1}\left(\frac{1+z^2}{1-z^2}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z < 0)$$

01.28.27.2312.01

$$\coth^{-1}(z) = \frac{\sqrt{z^2}}{2z}\cosh^{-1}\left(\frac{1+z^2}{1-z^2}\right) - \frac{1}{2}\pi z \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\frac{z^2+1}{z^2-1}\right)$

01.28.27.2313.01

$$\coth^{-1}(z) = \frac{1}{2}\cosh^{-1}\left(\frac{z^2+1}{z^2-1}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2314.01

$$\coth^{-1}(z) = -\frac{1}{2}\cosh^{-1}\left(\frac{z^2+1}{z^2-1}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z < -1)$$

01.28.27.2315.01

$$\coth^{-1}(z) = -\pi i + \frac{1}{2}\cosh^{-1}\left(\frac{z^2+1}{z^2-1}\right) /; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.2316.01

$$\coth^{-1}(z) = \pi i - \frac{1}{2}\cosh^{-1}\left(\frac{z^2+1}{z^2-1}\right) /; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.28.27.2317.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}\right) + \frac{z}{2}\sqrt{\frac{1}{z^2}}\cosh^{-1}\left(\frac{z^2+1}{z^2-1}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

01.28.27.2318.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + \cosh^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2319.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + \cosh^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2320.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - \cosh^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2321.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - \cosh^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2322.01

$$\coth^{-1}(z) = -\frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} \sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2} + \frac{\sqrt{z^2}}{z} \cosh^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

01.28.27.2323.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + \cosh^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; 0 \leq \arg[z] \leq \frac{\pi}{2}$$

01.28.27.2324.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + \cosh^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2325.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - \cosh^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2326.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - \cosh^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2327.01

$$\coth^{-1}(z) = -\frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} + \frac{\sqrt{z^2}}{z} \cosh^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

01.28.27.2328.01

$$\coth^{-1}(z) = \cosh^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) /; \operatorname{Re}(z) > 0$$

01.28.27.2329.01

$$\coth^{-1}(z) = -\cosh^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) /; (i\, z \in \mathbb{R} \land i\, z < 0)$$

01.28.27.2330.01

$$\coth^{-1}(z) = -\pi\, i - \cosh^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2331.01

$$\coth^{-1}(z) = \pi\, i - \cosh^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2332.01

$$\coth^{-1}(z) = \frac{\pi}{2}\left(-2\, i \sqrt{z} \sqrt{\frac{1}{z}} + 2\, i + \frac{\sqrt{-z^2}}{z} - \frac{\sqrt{-z^2}}{\sqrt{z^2}}\right) + i \sqrt{-\frac{i}{z}} \sqrt{-i\, z} \cosh^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

01.28.27.2333.01

$$\coth^{-1}(z) = \cosh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.28.27.2334.01

$$\coth^{-1}(z) = -\cosh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2335.01

$$\coth^{-1}(z) = z \sqrt{\frac{1}{z^2}} \cosh^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

01.28.27.2336.01

$$\coth^{-1}(z) = \cosh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2337.01

$$\coth^{-1}(z) = -\cosh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2338.01

$$\coth^{-1}(z) = -\pi i + \cosh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2339.01

$$\coth^{-1}(z) = \pi i - \cosh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2340.01

$$\coth^{-1}(z) = z \sqrt{\frac{1}{z^2}} \cosh^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

01.28.27.2341.01

$$\coth^{-1}(z) = \cosh^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2342.01

$$\coth^{-1}(z) = -\cosh^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2343.01

$$\coth^{-1}(z) = -\pi i + \cosh^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2344.01

$$\coth^{-1}(z) = \pi i - \cosh^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2345.01

$$\coth^{-1}(z) = z\sqrt{\frac{1}{z^2}}\cosh^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z^2}+1} \Big/ \left(\sqrt{2}\,(1-z^2)^{1/4}\right)\right)$

01.28.27.2346.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) - \frac{\pi i}{2} /;\ 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2347.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) + \frac{\pi i}{2} /;\ -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2348.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) - \frac{\pi i}{2} /;\ \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2349.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) + \frac{\pi i}{2} /;\ -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2350.01

$$\coth^{-1}(z) = \frac{2\sqrt{z^2}}{z}\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) - \frac{\pi z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z^2}-1} \Big/ \left(\sqrt{2}\,(1-z^2)^{1/4}\right)\right)$

01.28.27.2351.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) + \frac{\pi i}{2} \;/;\; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.2352.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) - \frac{\pi i}{2} \;/;\; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2353.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) + \frac{\pi i}{2} \;/;\; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2354.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2355.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2356.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) + \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2357.01

$$\coth^{-1}(z) = 2z\sqrt{\frac{1}{z^2}}\,\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z^2}-1}}{\sqrt{2}\,(1-z^2)^{1/4}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z^2}+1\right)\Big/\left(2\sqrt{1-z^2}\right)}\right)$

01.28.27.2358.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2359.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2360.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2361.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2362.01

$$\coth^{-1}(z) = \frac{2\sqrt{z^2}}{z}\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}+1}{2\sqrt{1-z^2}}}\right) - \frac{\pi z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z^2}-1\right)\Big/\left(2\sqrt{1-z^2}\right)}\right)$

01.28.27.2363.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} /; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.2364.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2365.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2366.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2367.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2368.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) + \frac{3\pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2369.01

$$\coth^{-1}(z) = 2z\sqrt{\frac{1}{z^2}}\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z^2}-1}{2\sqrt{1-z^2}}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\sqrt{z^2-1}+z} \Big/ \left(\sqrt{2}\,(z^2-1)^{1/4}\right)\right)$

01.28.27.2370.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /; \operatorname{Re}(z) > 0$$

01.28.27.2371.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /; (i z \in \mathbb{R} \land i z < 0)$$

01.28.27.2372.01

$$\coth^{-1}(z) = -\pi i - 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2373.01

$$\coth^{-1}(z) = \pi i - 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2374.01

$$\coth^{-1}(z) = \frac{\pi}{2}\sqrt{\frac{1}{z}}\sqrt{-z}\left(1-\frac{\sqrt{z^2}}{z}\right) + 2i\sqrt{-\frac{i}{z}}\sqrt{-iz}\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}+z}}{\sqrt{2}\,(z^2-1)^{1/4}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\sqrt{z^2-1}-z} \Big/ \left(\sqrt{2}\,(z^2-1)^{1/4}\right)\right)$

01.28.27.2375.01

$$\coth^{-1}(z) = -\pi i + 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,\sqrt[4]{z^2-1}}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2376.01

$$\coth^{-1}(z) = \pi i + 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,\sqrt[4]{z^2-1}}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2377.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,\sqrt[4]{z^2-1}}\right) /; \operatorname{Re}(z) < 0$$

01.28.27.2378.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,\sqrt[4]{z^2-1}}\right) /; (iz \in \mathbb{R} \land iz > 0)$$

01.28.27.2379.01

$$\coth^{-1}(z) = -\frac{\pi}{2}\sqrt{-\frac{1}{z}}\sqrt{z}\left(1+\frac{\sqrt{z^2}}{z}\right) - 2i\sqrt{\frac{i}{z}}\sqrt{iz}\cosh^{-1}\left(\frac{\sqrt{\sqrt{z^2-1}-z}}{\sqrt{2}\,\sqrt[4]{z^2-1}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{z^2-1}+z\right)\Big/\left(2\sqrt{z^2-1}\right)}\right)$

01.28.27.2380.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /; \operatorname{Re}(z) > 0$$

01.28.27.2381.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /; (i\,z \in \mathbb{R} \land i\,z < 0)$$

01.28.27.2382.01

$$\coth^{-1}(z) = -\pi\,i - 2\cosh^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2383.01

$$\coth^{-1}(z) = \pi\,i - 2\cosh^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2384.01

$$\coth^{-1}(z) = \frac{\pi}{2}\sqrt{\frac{1}{z}}\sqrt{-z}\left(1-\frac{\sqrt{z^2}}{z}\right) + 2\,i\sqrt{-\frac{i}{z}}\sqrt{-i\,z}\cosh^{-1}\left(\sqrt{\frac{z+\sqrt{z^2-1}}{2\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}(z)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{z^2-1}-z\right)\Big/\left(2\sqrt{z^2-1}\right)}\right)$

01.28.27.2385.01

$$\coth^{-1}(z) = -\pi\,i + 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2386.01

$$\coth^{-1}(z) = \pi\,i + 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2387.01

$$\coth^{-1}(z) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right) /; \operatorname{Re}(z) < 0$$

01.28.27.2388.01

$$\coth^{-1}(z) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right)\ /;\ (i\,z \in \mathbb{R} \land i\,z > 0)$$

01.28.27.2389.01

$$\coth^{-1}(z) = -\frac{\pi}{2}\sqrt{-\frac{1}{z}}\ \sqrt{z}\left(1+\frac{\sqrt{z^2}}{z}\right) - 2\,i\sqrt{\frac{i}{z}}\ \sqrt{i\,z}\ \cosh^{-1}\left(\sqrt{\frac{\sqrt{z^2-1}-z}{2\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\frac{1+z}{1-z}\right)$

01.28.27.2390.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{1+z}{1-z}\right) - \frac{\pi\,i}{2}\ /;\ \operatorname{Im}(z) \geq 0$$

01.28.27.2391.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{1+z}{1-z}\right) + \frac{\pi\,i}{2}\ /;\ \operatorname{Im}(z) < 0$$

01.28.27.2392.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{1+z}{1-z}\right) - \frac{1}{2}\sqrt{z}\ \sqrt{-\frac{1}{z}}\ \pi$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\frac{z+1}{z-1}\right)$

01.28.27.2393.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{z+1}{z-1}\right)\ /;\ z \notin (-\infty, 1)$$

01.28.27.2394.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{z+1}{z-1}\right) - \pi\,i\ /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2395.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\cosh^{-1}\left(\frac{z+1}{z-1}\right)\ /;\ (z \in \mathbb{R} \land z < 0)$$

01.28.27.2396.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi\,i}{2}\left(\sqrt{\frac{z-1}{z}}\ \sqrt{\frac{z}{z-1}} - 1\right) + \frac{\sqrt{z}}{2}\sqrt{\frac{1}{z}}\ \cosh^{-1}\left(\frac{z+1}{z-1}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$

01.28.27.2397.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.2398.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2399.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2400.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) - \frac{\pi i}{4} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2401.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + \frac{i z}{2\sqrt{-z^2}} - 1\right)\frac{\pi i}{2} + \frac{1}{2}\sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$

01.28.27.2402.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{3\pi i}{4} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \le \pi$$

01.28.27.2403.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{3\pi i}{4} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.2404.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \frac{3 i\sqrt{-z^2}}{2z} - 1\right)\frac{\pi i}{2} + \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) \;/;\; |z| < 1$$

01.28.27.2405.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{\pi i}{4} \;/;\; |z| > 1 \land \operatorname{Im}(z) > 0$$

01.28.27.2406.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi i}{4} \;/;\; |z| > 1 \land \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 0)$$

01.28.27.2407.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{\pi i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2408.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi z}{4\sqrt{-z^2}} + \frac{1}{2}\sqrt{\frac{1}{z+1}}\sqrt{z+1}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /; |z| > 1$$

01.28.27.2409.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi}{8}\left(2\,i\left(-1+\sqrt{\frac{-1+z}{z}}\sqrt{\frac{z}{-1+z}}+\frac{3\,i\,z}{2\sqrt{-z^2}}\right)\left(1-\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right)+\frac{z}{\sqrt{-z^2}}\left(1+\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right)\right)+ \frac{1}{4}\left(1-\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}+\sqrt{\frac{1}{1+z}}\sqrt{1+z}\left(1+\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right)\right)\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

01.28.27.2410.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} + \cosh^{-1}\left(\frac{1}{\sqrt{1-z}}\right) /; 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2411.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} + \cosh^{-1}\left(\frac{1}{\sqrt{1-z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2412.01

$$\coth^{-1}\left(\sqrt{z}\right) = \cosh^{-1}\left(\frac{1}{\sqrt{1-z}}\right) - \frac{1}{2}\pi\sqrt{\frac{1}{1-z}}\sqrt{-\frac{1}{z}}\sqrt{(1-z)\,z}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

01.28.27.2413.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} + \cosh^{-1}\left(\sqrt{\frac{1}{1-z}}\right) /; \operatorname{Im}(z) \geq 0$$

01.28.27.2414.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} + \cosh^{-1}\left(\sqrt{\frac{1}{1-z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.2415.01

$$\coth^{-1}\left(\sqrt{z}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \frac{1}{2}\pi\sqrt{-\frac{1}{z}}\sqrt{z}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

01.28.27.2416.01

$$\coth^{-1}\left(\sqrt{z}\right) = \cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) /; |\arg(z)| < \pi$$

01.28.27.2417.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2418.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

01.28.27.2419.01

$$\coth^{-1}\left(\sqrt{z}\right) = \cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; z \notin (-\infty, 1)$$

01.28.27.2420.01

$$\coth^{-1}\left(\sqrt{z}\right) = \cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2421.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2422.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

01.28.27.2423.01

$$\coth^{-1}\left(\sqrt{z}\right) = \cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right) /; z \notin (-\infty, 1)$$

01.28.27.2424.01

$$\coth^{-1}\left(\sqrt{z}\right) = \cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2425.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2426.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} - 1\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z}+1}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2427.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2428.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2429.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z}-1}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2430.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0$$

01.28.27.2431.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2432.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2433.01

$$\coth^{-1}(\sqrt{z}) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2434.01

$$\coth^{-1}(\sqrt{z}) = 2\sqrt{z}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{1}{2}\pi\left(\frac{\sqrt{z-1}}{\sqrt{1-z}} + \frac{2\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z}+1\right)\Big/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2435.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2436.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2437.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cosh^{-1}\left(\sqrt{(\sqrt{1-z}-1)/(2\sqrt{1-z})}\right)$

01.28.27.2438.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0$$

01.28.27.2439.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2440.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2441.01

$$\coth^{-1}(\sqrt{z}) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2442.01

$$\coth^{-1}(\sqrt{z}) = 2\sqrt{z}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{1}{2}\pi\left(\frac{\sqrt{z-1}}{\sqrt{1-z}} + \frac{2\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z}+\sqrt{-z}}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2443.01

$$\coth^{-1}(\sqrt{z}) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) /; z \notin (-\infty, 1)$$

01.28.27.2444.01

$$\coth^{-1}\left(\sqrt{z}\right) == 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \pi i \,/;\, (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2445.01

$$\coth^{-1}\left(\sqrt{z}\right) == -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) /;\, (z \in \mathbb{R} \land z < 0)$$

01.28.27.2446.01

$$\coth^{-1}\left(\sqrt{z}\right) == 2\sqrt{z}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \frac{\pi i}{2}\left(1-\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z}-\sqrt{-z}} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2447.01

$$\coth^{-1}\left(\sqrt{z}\right) == 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \pi i \,/;\, 0 < \arg(z) \leq \pi$$

01.28.27.2448.01

$$\coth^{-1}\left(\sqrt{z}\right) == \pi i + 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) /;\, \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2449.01

$$\coth^{-1}\left(\sqrt{z}\right) == 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) /;\, (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2450.01

$$\coth^{-1}\left(\sqrt{z}\right) == \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \frac{2 i\sqrt{-z^2}}{z} - 1\right) + 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z}+\sqrt{-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2451.01

$$\coth^{-1}\left(\sqrt{z}\right) == 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) /;\, z \notin (-\infty, 1)$$

01.28.27.2452.01

$$\coth^{-1}\left(\sqrt{z}\right) == 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) - \pi i \,/;\, (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2453.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2454.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2}\left(1-\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z}-\sqrt{-z}\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2455.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \pi i /; 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2456.01

$$\coth^{-1}\left(\sqrt{z}\right) = \pi i + 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.2457.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2458.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2}\left(1-\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + 2 i \sqrt{z}\sqrt{-\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\frac{1+z}{1-z}\right)$

01.28.27.2459.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{1+z}{1-z}\right) /; z \notin (1, \infty)$$

01.28.27.2460.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{1+z}{1-z}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2461.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{1+z}{1-z}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\frac{z+1}{z-1}\right)$

01.28.27.2462.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{z+1}{z-1}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.2463.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{z+1}{z-1}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.2464.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\cosh^{-1}\left(\frac{z+1}{z-1}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2465.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\sqrt{z}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\frac{z+1}{z-1}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$

01.28.27.2466.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} + \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.2467.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{4} + \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.2468.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} - \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right) \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2469.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi z}{4\sqrt{-z^2}} + \frac{1}{2}\sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\cosh^{-1}\left(\frac{2\sqrt{-z}}{1-z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right)$

01.28.27.2470.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{\pi i}{4} \;/;\; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.2471.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} + \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) \;/;\; |z| < 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.2472.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{\pi\sqrt{-z^2}}{4z} /; |z| < 1$$

01.28.27.2473.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{3\pi i}{4} /; |z| > 1 \land \operatorname{Im}(z) > 0$$

01.28.27.2474.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{3\pi i}{4} /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.2475.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) + \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2476.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\sqrt{z+1}\sqrt{\frac{1}{z+1}}\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) - \frac{3\pi\sqrt{-z^2}}{4z} /; |z| > 1$$

01.28.27.2477.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi z}{4\sqrt{-z^2}}\left(1 + \frac{2(z+1)}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right) + \frac{1}{4}\left(1 - \frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2} + \sqrt{\frac{1}{1+z}}\sqrt{1+z}\left(1 + \frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right)\right)\cosh^{-1}\left(\frac{2\sqrt{-z}}{z-1}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

01.28.27.2478.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \cosh^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

01.28.27.2479.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{1-z}}\right) /; z \notin (1, \infty)$$

01.28.27.2480.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{1-z}}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2481.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{1-z}}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

01.28.27.2482.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) /; \operatorname{Im}(z) > 0 \land (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2483.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2484.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2485.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{z-1}}{2\sqrt{-z}}\sqrt{\frac{z}{z-1}} + \sqrt{\frac{1}{z}}\sqrt{z}\cosh^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

01.28.27.2486.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.2487.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \le 0$$

01.28.27.2488.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2489.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

01.28.27.2490.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.2491.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq 0$$

01.28.27.2492.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2493.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\sqrt{\frac{z}{z-1}}\right) - \frac{\pi \sqrt{-z^2}}{2 z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z}+1} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2494.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2 \cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z}-1} \Big/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2495.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \pi i + 2 \cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.2496.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2 \cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \pi i /; -\pi < \arg(z) \leq 0$$

01.28.27.2497.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2 \cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \pi i /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2498.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2 \sqrt{z} \sqrt{\frac{1}{z}} \cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-1}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) - \frac{\pi \sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z}+1\right) \big/ \left(2\sqrt{1-z}\right)}\right)$

01.28.27.2499.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+1}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z}-1\right)/\left(2\sqrt{1-z}\right)}\right)$

01.28.27.2500.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \pi i + 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.2501.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \pi i /; -\pi < \arg(z) \leq 0$$

01.28.27.2502.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) + \pi i /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2503.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-1}{2\sqrt{1-z}}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z}+\sqrt{-z}}\Big/\left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2504.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0$$

01.28.27.2505.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq 0$$

01.28.27.2506.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2507.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi z}{2\sqrt{-z^2}} + 2\sqrt{z}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}+\sqrt{-z}}}{\sqrt{2}\sqrt[4]{1-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\sqrt{1-z}-\sqrt{-z}} \middle/ \left(\sqrt{2}\,(1-z)^{1/4}\right)\right)$

01.28.27.2508.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) - \frac{\pi i}{2} /;\ 0 < \arg(z) \leq \pi$$

01.28.27.2509.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,\sqrt[4]{1-z}}\right) + \frac{\pi i}{2} /;\ -\pi < \arg(z) \leq 0$$

01.28.27.2510.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\frac{\sqrt{\sqrt{1-z}-\sqrt{-z}}}{\sqrt{2}\,(1-z)^{1/4}}\right) + \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z}+\sqrt{-z}\right) \middle/ \left(2\sqrt{1-z}\right)}\right)$

01.28.27.2511.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /;\ \operatorname{Im}(z) > 0$$

01.28.27.2512.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /;\ -\pi < \arg(z) \leq 0$$

01.28.27.2513.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} /;\ (z \in \mathbb{R} \land z < 0)$$

01.28.27.2514.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi z}{2\sqrt{-z^2}} + 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}+\sqrt{-z}}{2\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\cosh^{-1}\left(\sqrt{\left(\sqrt{1-z}-\sqrt{-z}\right) \middle/ \left(2\sqrt{1-z}\right)}\right)$

01.28.27.2515.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{\pi i}{2} /;\ 0 < \arg(z) \leq \pi$$

01.28.27.2516.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2517.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2518.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\cosh^{-1}\left(\sqrt{\frac{\sqrt{1-z}-\sqrt{-z}}{2\sqrt{1-z}}}\right) + \left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{i\sqrt{-z^2}}{2z} - 1\right)\pi i$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2519.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi i}{2} + \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.2520.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.2521.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = -\frac{\pi\sqrt{-z}}{2\sqrt{z}} + \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2522.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi i}{2} + \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.2523.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) \leq 0$$

01.28.27.2524.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{1}{2}\pi\sqrt{\frac{1}{z}}\sqrt{-z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2525.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2526.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi$$

01.28.27.2527.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2528.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right) + \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2529.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; z \notin (1, \infty)$$

01.28.27.2530.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\cosh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2531.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \sqrt{1-z}\sqrt{\frac{1}{1-z}} \cosh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2532.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi \bigwedge z \notin (1, \infty)$$

01.28.27.2533.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2534.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \cosh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2535.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right) + \sqrt{1-z}\sqrt{\frac{1}{1-z}}\cosh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\cosh^{-1}(\sqrt{z})$

01.28.27.2536.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \cosh^{-1}(\sqrt{z}) - \frac{\pi i}{2} /; \operatorname{Im}(z) \geq 0$$

01.28.27.2537.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \cosh^{-1}(\sqrt{z}) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.2538.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \cosh^{-1}(\sqrt{z}) - \frac{1}{2}\pi\sqrt{z}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\cosh^{-1}(\sqrt{z})$

01.28.27.2539.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \cosh^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2540.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \cosh^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.2541.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -\cosh^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.2542.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi \sqrt{1-z} \sqrt{-z}}{2 \sqrt{z}} \sqrt{\frac{1}{1-z}} + \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} \cosh^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\cosh^{-1}\left(\sqrt{z}\right)$

01.28.27.2543.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \cosh^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) \geq 0$$

01.28.27.2544.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \cosh^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.2545.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \cosh^{-1}\left(\sqrt{z}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\cosh^{-1}\left(\sqrt{z}\right)$

01.28.27.2546.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \cosh^{-1}\left(\sqrt{z}\right) \;/;\; |\arg(z)| < \pi$$

01.28.27.2547.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \cosh^{-1}\left(\sqrt{z}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0027.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \cosh^{-1}\left(\sqrt{z}\right) + \frac{\pi\, i}{2}\left(\sqrt{z}\, \sqrt{\frac{1}{z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\cosh^{-1}\left(\sqrt{z}\right)$

01.28.27.2548.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \cosh^{-1}\left(\sqrt{z}\right) \;/;\; z \notin (-\infty, 1)$$

01.28.27.2549.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \cosh^{-1}\left(\sqrt{z}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2550.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -\cosh^{-1}\left(\sqrt{z}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2551.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \left(\sqrt{z}\, \sqrt{\frac{1}{z}} - 1\right)\frac{\pi\, i}{2} + \sqrt{\frac{z-1}{z}}\, \sqrt{\frac{z}{z-1}}\, \cosh^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\cosh^{-1}\left(\sqrt{z}\right)$

01.28.27.2552.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \cosh^{-1}\left(\sqrt{z}\right) \;/;\; z \notin (-\infty, 1)$$

01.28.27.2553.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -\cosh^{-1}\left(\sqrt{z}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2554.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \cosh^{-1}\left(\sqrt{z}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.0026.02

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\cosh^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z+a}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2555.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2}\cosh^{-1}(z) \;/;\; z \notin (-\infty, -1)$$

01.28.27.2556.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2}\cosh^{-1}(z) - \pi i \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.0029.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2}\cosh^{-1}(z) + \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2557.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2}\cosh^{-1}(z) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) \geq 0$$

01.28.27.2558.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2}\cosh^{-1}(z) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.2559.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2}\cosh^{-1}(z) - \frac{1}{2}\sqrt{z}\sqrt{-\frac{1}{z}}\,\pi$$

Involving $\coth^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-a-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2560.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\cosh^{-1}(z) \;/;\; z \notin (-\infty, 1)$$

01.28.27.2561.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{1}{2}\cosh^{-1}(z) \,/;\, (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.2562.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\cosh^{-1}(z) - \pi\, i \,/;\, (z \in \mathbb{R} \land z < -1)$$

01.28.27.2563.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\sqrt{\frac{z^2-1}{z^2}}\sqrt{\frac{z^2}{z^2-1}}\cosh^{-1}(z) - \frac{\pi\, i}{2}\left(1 - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2564.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\cosh^{-1}(z) - \frac{\pi\, i}{2} \,/;\, \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2565.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\cosh^{-1}(z) + \frac{\pi\, i}{2} \,/;\, \operatorname{Im}(z) < 0$$

01.28.27.2566.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2}\cosh^{-1}(z) + \frac{\pi\, i}{2} \,/;\, (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.2567.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\sqrt{\frac{z^2-1}{z^2}}\sqrt{\frac{z^2}{z^2-1}}\cosh^{-1}(z) - \frac{\pi\sqrt{-z}\, z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-a}{z+a}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2568.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\cosh^{-1}(z) \,/;\, z \notin (-\infty, 1)$$

01.28.27.2569.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{1}{2}\cosh^{-1}(z) \,/;\, (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.2570.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\cosh^{-1}(z) - \pi i \;/;\; (z \in \mathbb{R} \wedge z < -1)$$

01.28.27.0028.02

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\sqrt{\frac{z-1}{z+1}}\sqrt{\frac{z+1}{z-1}}\cosh^{-1}(z) + \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2571.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\cosh^{-1}(z) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) \geq 0$$

01.28.27.2572.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\cosh^{-1}(z) + \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.2573.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\cosh^{-1}(z) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2574.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi i}{2} + \cosh^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.2575.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \cosh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.2576.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \cosh^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.28.27.2577.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -\cosh^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \wedge z < -1)$$

01.28.27.2578.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \sqrt{z+1}\sqrt{\frac{1}{z+1}}\cosh^{-1}\left(\frac{1}{z}\right) - \frac{\pi}{2}\left(\frac{\sqrt{z-1}}{\sqrt{1-z}} - \frac{\sqrt{z^2}\sqrt{-1+z^2}}{z\sqrt{1-z^2}} + \frac{\sqrt{-z-1}}{\sqrt{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2579.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \cosh^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2580.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \cosh^{-1}\left(\frac{1}{z}\right) + \pi i /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2581.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \cosh^{-1}\left(\frac{1}{z}\right) - \pi i /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2582.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -\cosh^{-1}\left(\frac{1}{z}\right) + \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2583.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \left(\frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} + \frac{z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\right)\frac{\pi}{2} + \sqrt{z+1}\sqrt{\frac{1}{z+1}}\cosh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2584.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \cosh^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2585.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \cosh^{-1}\left(\frac{1}{z}\right) + \pi i /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2586.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \cosh^{-1}\left(\frac{1}{z}\right) - \pi i \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2587.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -\cosh^{-1}\left(\frac{1}{z}\right) \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2588.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \left(\frac{\sqrt{z^2}}{z} - 1\right) \frac{\pi \sqrt{-z}}{2} \sqrt{\frac{1}{z}} + \sqrt{\frac{1}{1-z}} \sqrt{1-z} \cosh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2589.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \cosh^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2590.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\cosh^{-1}\left(\frac{1}{z}\right) - \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2591.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\cosh^{-1}\left(\frac{1}{z}\right) + \pi i \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.2592.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\cosh^{-1}\left(\frac{1}{z}\right) \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2593.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \frac{\sqrt{z^2}\sqrt{1-z}}{z} \sqrt{\frac{1}{1-z}} \cosh^{-1}\left(\frac{1}{z}\right) - \left(\frac{\sqrt{z^2}}{z} - 1\right) \frac{\pi \sqrt{-z}}{2} \sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$ and $\cosh^{-1}(z)$

01.28.27.0030.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \cosh^{-1}(z) /; \operatorname{Re}(z) > 0$$

01.28.27.2594.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\cosh^{-1}(z) + \pi i /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2595.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\cosh^{-1}(z) - \pi i /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2596.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \cosh^{-1}(z) - \pi i /; (i z \in \mathbb{R} \land i z < 0) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2597.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\cosh^{-1}(z) /; (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.2598.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi \sqrt{z^2-1}}{2\sqrt{1-z^2}}\left(z\sqrt{\frac{1}{z^2}} - 1\right) + \frac{\sqrt{-z-1}\sqrt{z^2}}{\sqrt{-z^2}\sqrt{z+1}} \cosh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2599.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \cosh^{-1}(z) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.28.27.2600.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \cosh^{-1}(z) - \pi i \;/;\; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2601.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \cosh^{-1}(z) + \pi i \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2602.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \pi i - \cosh^{-1}(z) \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2603.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi \sqrt{z^2-1}}{2\sqrt{1-z^2}}\left(\sqrt{z^2}\sqrt{\frac{1}{z^2}} - \frac{\sqrt{z^2}}{z}\right) + \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} \cosh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2604.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \cosh^{-1}(z) \;/;\; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2605.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \cosh^{-1}(z) - \pi i \;/;\; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.2606.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \cosh^{-1}(z) + \pi i \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2607.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -\cosh^{-1}(z) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2608.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{-z}}{\sqrt{z}} - \sqrt{-z^2}\sqrt{\frac{1}{z^2}}\right) + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} \cosh^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2609.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \cosh^{-1}(z) \;/;\; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2610.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \cosh^{-1}(z) - \pi i \;/;\; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.2611.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \cosh^{-1}(z) + \pi i \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2612.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -\cosh^{-1}(z) \;/;\; (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.2613.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \sqrt{\frac{z-1}{z}} \sqrt{\frac{z}{z-1}} \cosh^{-1}(z) - \frac{\pi\sqrt{-z^2}}{2z}\left(z\sqrt{\frac{1}{z^2}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$ and $\cosh^{-1}(z)$

01.28.27.2614.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \cosh^{-1}(z) - \frac{\pi i}{2} \;/;\; 0 \leq \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.28.27.2615.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi i}{2} + \cosh^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2616.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\cosh^{-1}(z) + \frac{\pi i}{2} \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2617.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\cosh^{-1}(z) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2618.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\cosh^{-1}(z) + \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2619.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{i\sqrt{1-z^2}}{\sqrt{z^2-1}} - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right) + \frac{\sqrt{-1-z}\sqrt{z^2}}{\sqrt{-z^2}\sqrt{1+z}}\cosh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2620.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \cosh^{-1}(z) - \frac{\pi i}{2} \;/;\; 0 \leq \arg(z) < \pi$$

01.28.27.2621.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi i}{2} + \cosh^{-1}(z) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.2622.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \cosh^{-1}(z) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2623.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -\cosh^{-1}(z) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2624.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - \frac{i\sqrt{z^2-z^4}}{z\sqrt{-1+z^2}} - 1\right)\frac{\pi i}{2} + \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\cosh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2625.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \cosh^{-1}(z) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2626.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi i}{2} + \cosh^{-1}(z) /; \operatorname{Im}(z) < 0$$

01.28.27.2627.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \cosh^{-1}(z) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2628.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -\cosh^{-1}(z) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2629.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - \frac{i\sqrt{-z^2}}{z} - 1\right)\frac{\pi i}{2} + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\cosh^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2630.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \cosh^{-1}(z) - \frac{\pi i}{2} /; 0 \le \arg(z) < \pi$$

01.28.27.2631.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi i}{2} + \cosh^{-1}(z) /; \operatorname{Im}(z) < 0$$

01.28.27.2632.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \cosh^{-1}(z) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2633.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -\cosh^{-1}(z) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2634.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\cosh^{-1}(z) + \left(\sqrt{\frac{1}{z+1}}\sqrt{z+1} + \frac{i z}{2}\sqrt{-\frac{1}{z^2}} - 1\right)\pi i$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$ and $\cosh^{-1}(i z)$

01.28.27.2635.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = \frac{1}{2}\cosh^{-1}(i z) - \frac{\pi i}{4} \;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2} \bigvee (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.2636.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = -\frac{1}{2}\cosh^{-1}(i z) - \frac{\pi i}{4} \;/;\; \operatorname{Re}(z) < 0 \lor (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.2637.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = -\frac{i\sqrt{-1+i z}}{2\sqrt{1-i z}}\cosh^{-1}(i z) - \frac{\pi i}{4}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right)$ and $\cosh^{-1}(i z)$

01.28.27.2638.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{3\pi i}{4} + \frac{1}{2}\cosh^{-1}(i z) \;/;\; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.2639.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi i}{4} + \frac{1}{2}\cosh^{-1}(i z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.2640.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{3\pi i}{4} - \frac{1}{2}\cosh^{-1}(i z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2641.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi i}{4} - \frac{1}{2}\cosh^{-1}(i z) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0) \bigvee (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.2642.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{i\sqrt{-1+i z}}{2\sqrt{1-i z}}\cosh^{-1}(i z) - \frac{1}{2}\pi\left(\frac{i}{2} + \sqrt{-\frac{1}{z^2}}\; z\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right)$ and $\cosh^{-1}(i z)$

01.28.27.2643.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{3\pi i}{4} + \frac{1}{2}\cosh^{-1}(i z) \;/;\; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.2644.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{\pi i}{4} + \frac{1}{2}\cosh^{-1}(i z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.2645.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{3\pi i}{4} - \frac{1}{2}\cosh^{-1}(i z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2646.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{\pi i}{4} - \frac{1}{2}\cosh^{-1}(i z) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0) \bigvee (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.2647.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{i\sqrt{-1+i z}}{2\sqrt{1-i z}}\cosh^{-1}(i z) - \frac{1}{2}\pi\left(\frac{i}{2} + \sqrt{-\frac{1}{z^2}}\; z\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right)$ and $\cosh^{-1}(i z)$

01.28.27.2648.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = \frac{1}{2}\cosh^{-1}(i\,z) - \frac{\pi\,i}{4} \;/;\; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2} \bigvee (i\,z \in \mathbb{R} \land 0 < i\,z < 1)$$

01.28.27.2649.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = -\frac{1}{2}\cosh^{-1}(i\,z) - \frac{\pi\,i}{4} \;/;\; \operatorname{Re}(z) < 0 \lor (i\,z \in \mathbb{R} \land i\,z > 1)$$

01.28.27.2650.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = -\frac{i\sqrt{-1+i\,z}}{2\sqrt{1-i\,z}}\cosh^{-1}(i\,z) - \frac{\pi\,i}{4}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2651.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{\pi\,i}{2} - 2\cosh^{-1}\left(\frac{1}{z}\right) \;/;\; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2652.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{\pi\,i}{2} - 2\cosh^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) \leq 0$$

01.28.27.2653.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{3\pi\,i}{2} - 2\cosh^{-1}\left(\frac{1}{z}\right) \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2654.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{3\pi\,i}{2} - 2\cosh^{-1}\left(\frac{1}{z}\right) \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2655.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{5\pi\,i}{2} - 2\cosh^{-1}\left(\frac{1}{z}\right) \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2656.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{3\pi\,i}{2} + 2\cosh^{-1}\left(\frac{1}{z}\right) \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2657.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = i\,\pi\left(1-\frac{i\sqrt{z^2}}{2\sqrt{-z^2}}-\sqrt{\frac{z^2}{z^2-1}}\sqrt{\frac{z^2-1}{z^2}}+\frac{i\,z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\right)-2\sqrt{z+1}\sqrt{\frac{1}{z+1}}\cosh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right)$ and $\cosh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2658.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = -2\cosh^{-1}\left(\frac{1}{z}\right)-\pi\,i\;/;\;|z|>\sqrt{2}\bigwedge \operatorname{Im}(z)>0$$

01.28.27.2659.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = -2\cosh^{-1}\left(\frac{1}{z}\right)+\pi\,i\;/;\;|z|>\sqrt{2}\bigwedge \operatorname{Im}(z)<0$$

01.28.27.2660.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\left(\theta\left(\left|\sqrt{z^2-1}\right|-1\right)+\frac{\sqrt{z^2}}{z}-1\right)\pi-\frac{2\sqrt{z-1}\sqrt{z^2}}{\sqrt{\frac{1}{z}-1}\;z^{3/2}}\cosh^{-1}\left(\frac{1}{z}\right)\right)$$

01.28.27.2661.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = -\frac{\pi}{2\sqrt{1-z^2}}\left(\left(z^2-2\right)\sqrt{\frac{z^4}{z^2-1}}\sqrt{\frac{z^2-1}{z^4}}\sqrt{\frac{z^2-1}{\left(z^2-2\right)^2}}-\right.$$
$$\left.\sqrt{1-\frac{1}{z^2}}\,z\left(\sqrt{\frac{1}{z^2}}\,z-\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}+\sqrt{\frac{i}{z}}\sqrt{-i\,z}-\sqrt{-\frac{i}{z}}\sqrt{i\,z}+\sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right)\right)-$$
$$\frac{2\,z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\left(\frac{\pi}{2}-\frac{\sqrt{-1+z}\sqrt{z}}{\sqrt{1-z}}\sqrt{\frac{1}{z}}\cosh^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{2\,z\sqrt{z^2-1}}{1-2\,z^2}\right)$

Involving $\coth^{-1}\left(\frac{2\,z\sqrt{z^2-1}}{1-2\,z^2}\right)$ and $\cosh^{-1}(z)$

01.28.27.2662.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2-1}}{1-2 z^2}\right) = \frac{\pi i}{2} - 2 \cosh^{-1}(z) /; 0 \leq \arg(z) < \frac{\pi}{2}$$

01.28.27.2663.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2-1}}{1-2 z^2}\right) = -\frac{\pi i}{2} - 2 \cosh^{-1}(z) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2664.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2-1}}{1-2 z^2}\right) = -\frac{3 \pi i}{2} + 2 \cosh^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2665.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2-1}}{1-2 z^2}\right) = \frac{3 \pi i}{2} + 2 \cosh^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.2666.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2-1}}{1-2 z^2}\right) = \frac{\pi i}{2} + 2 \cosh^{-1}(z) /; (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.2667.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2-1}}{1-2 z^2}\right) = \frac{3 \pi i}{2} - 2 \cosh^{-1}(z) /; (i z \in \mathbb{R} \land i z < 0) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2668.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2-1}}{1-2 z^2}\right) = -\frac{5 \pi i}{2} + 2 \cosh^{-1}(z) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2669.01

$$\coth^{-1}\left(\frac{2 z \sqrt{z^2-1}}{1-2 z^2}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} \left(\frac{\pi}{2}\left(-\sqrt{\frac{1}{1-z}}\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\sqrt{z+1} - \sqrt{-i z}\sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}}\sqrt{i z} + \frac{\sqrt{z^2}}{z} - 2\right) + \frac{2\sqrt{1-z}}{\sqrt{z-1}} \cosh^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{1-2 z^2}{2 z \sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{1-2 z^2}{2 z \sqrt{z^2-1}}\right)$ and $\cosh^{-1}(z)$

01.28.27.2670.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = \pi i - 2\cosh^{-1}(z) /; \frac{\pi}{4} \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2671.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\pi i + 2\cosh^{-1}(z) /; \frac{\pi}{2} < \arg(z) \leq \frac{3\pi}{4}$$

01.28.27.2672.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = \pi i + 2\cosh^{-1}(z) /; -\frac{3\pi}{4} \leq \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2673.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\pi i - 2\cosh^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq -\frac{\pi}{4}$$

01.28.27.2674.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(\frac{2\sqrt{1-z}}{\sqrt{z-1}}\cosh^{-1}(z) + \frac{\pi}{2}\left(\frac{\sqrt{z^2-1}\, z}{\sqrt{z^4-z^2}} + \sqrt{\frac{1}{z}}\sqrt{\frac{1}{\sqrt{2}\, z-1}}\sqrt{\sqrt{2}\, z-1}\sqrt{z} - \sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{-\sqrt{2}\, z-1}\sqrt{-\frac{1}{\sqrt{2}\, z+1}} + \frac{\sqrt{z^2}}{z} - 2\right)\right)$$

Involving $\tanh^{-1}$

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\tanh^{-1}(z)$

01.28.27.2675.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + \tanh^{-1}(z) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2676.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + \tanh^{-1}(z) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.0032.01

$$\coth^{-1}(z) = \tanh^{-1}(z) + \frac{\pi\sqrt{-z^2}}{2z} /; z \notin (-1, 1)$$

01.28.27.2677.01

$$\coth^{-1}(z) = \tanh^{-1}(z) - \frac{\pi i}{2}\operatorname{sgn}(\operatorname{Im}(z)) /; \operatorname{Im}(z) \neq 0$$

01.28.27.0033.02

$$\coth^{-1}(z) = \tanh^{-1}(z) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} \sqrt{\frac{1}{1-z^2}} \sqrt{1-z^2}$$

Involving $\coth^{-1}(z)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.0031.01

$$\coth^{-1}(z) = \tanh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\right)$ and $\tanh^{-1}(z)$

01.28.27.2678.01

$$\coth^{-1}\left(\frac{1}{z}\right) = \tanh^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\tanh^{-1}\left(\sqrt{z}\right)$

01.28.27.2679.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} + \tanh^{-1}\left(\sqrt{z}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2680.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} + \tanh^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2681.01

$$\coth^{-1}\left(\sqrt{z}\right) = \tanh^{-1}\left(\sqrt{z}\right) - \frac{\pi \sqrt{z-1}}{2 \sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2682.01

$$\coth^{-1}\left(\sqrt{z}\right) = \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2683.01

$$\coth^{-1}\left(\sqrt{z}\right) = \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi$$

01.28.27.2684.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2685.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\tanh^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right)$

01.28.27.2686.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} + \tanh^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2687.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2} + \tanh^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2688.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi i}{2} - \tanh^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2689.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi \sqrt{z-1}}{2 \sqrt{1-z}} + \sqrt{z} \sqrt{\frac{1}{z}} \tanh^{-1}\left(1 \middle/ \sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\tanh^{-1}\left(\sqrt{z}\right)$

01.28.27.2690.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \tanh^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2691.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2692.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{2} + \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2693.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\sqrt{z-1}\,\pi}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2694.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2695.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{2} + \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2696.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - \tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2697.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z}\,\sqrt{\frac{1}{z}}\,\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\sqrt{z-1}\,\pi}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\tanh^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right)$

01.28.27.2698.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \tanh^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; |\arg(z)| < \pi$$

01.28.27.2699.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\tanh^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2700.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z}\,\sqrt{\frac{1}{z}}\,\tanh^{-1}\left(1\Big/\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$ and $\tanh^{-1}(z)$

01.28.27.2701.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\pi i}{2} + \tanh^{-1}(z) \;/;\; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2702.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi i}{2} + \tanh^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2703.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\pi i}{2} - \tanh^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2704.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\frac{\pi i}{2} - \tanh^{-1}(z) \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2705.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \tanh^{-1}(z) - \frac{\pi \sqrt{z^2 - 1}}{2 \sqrt{1 - z^2}}$$

Involving $\coth^{-1}\left(\sqrt{z^2}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2706.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \tanh^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2707.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = -\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2708.01

$$\coth^{-1}\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \tanh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(a\,(b\,z^c)^m\right)$

Involving $\coth^{-1}(a\,(b\,z^c)^m)$ and $\tanh^{-1}\left(\frac{1}{a}\,b^{-m}\,z^{-m\,c}\right)$

01.28.27.2709.01

$$\coth^{-1}(a\,(b\,z^c)^m) = \frac{(b\,z^c)^m}{b^m\,z^{m\,c}} \tanh^{-1}\left(\frac{1}{a}\,b^{-m}\,z^{-m\,c}\right) \;/;\; 2\,m \in \mathbb{Z}$$

Involving $\coth^{-1}\left(\frac{2\,z}{1+z^2}\right)$

Involving $\coth^{-1}\left(\frac{2z}{1+z^2}\right)$ and $\tanh^{-1}(z)$

01.28.27.2710.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) == 2\tanh^{-1}(z) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2711.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) == 2\tanh^{-1}(z) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2712.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) == 2\tanh^{-1}(z) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\frac{2z}{1+z^2}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2713.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) == 2\tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2714.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) == 2\tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2715.01

$$\coth^{-1}\left(\frac{2z}{1+z^2}\right) == 2\tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2}$$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$ and $\tanh^{-1}(z)$

01.28.16.0004.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) == 2\tanh^{-1}(z) /; |z| < 1$$

01.28.27.2716.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) == 2\tanh^{-1}(z) - \pi i /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.2717.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) == 2\tanh^{-1}(z) + \pi i /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.2718.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\tanh^{-1}(z) + \frac{\pi\sqrt{-z^2}}{z} \;/;\; |z| > 1$$

01.28.27.2719.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \frac{\pi\sqrt{-z^2}}{2z}\left(\frac{z+i}{z-i}\sqrt{\left(\frac{z-i}{z+i}\right)^2}+1\right) + 2\tanh^{-1}(z) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1+z^2}{2z}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2720.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \pi i + 2\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; |z| < 1 \bigwedge 0 \leq \arg(z) < \pi$$

01.28.27.2721.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = -\pi i + 2\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; |z| < 1 \bigwedge -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2722.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \pi\sqrt{-\frac{1}{z^2}}\,z + 2\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; |z| < 1$$

01.28.27.2723.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = 2\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; |z| > 1$$

01.28.27.2724.01

$$\coth^{-1}\left(\frac{1+z^2}{2z}\right) = \frac{\pi}{2}\left(1-\frac{z+i}{z-i}\sqrt{\left(\frac{z-i}{z+i}\right)^2}\right)\sqrt{-\frac{1}{z^2}}\,z + 2\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right)$ and $\tanh^{-1}\left(\sqrt{z}\right)$

01.28.27.2725.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\tanh^{-1}\left(\sqrt{z}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2726.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\tanh^{-1}\left(\sqrt{z}\right) + \frac{\pi i}{2} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2727.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\tanh^{-1}\left(\sqrt{z}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right)$ and $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2728.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.2729.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2730.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{1-z}}{2\sqrt{z-1}}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right)$ and $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2731.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \vee (z \in \mathbb{R} \wedge 0 < z < 1)$$

01.28.27.2732.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \vee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2733.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = -2\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \wedge z < 0)$$

01.28.27.2734.01

$$\coth^{-1}\left(\frac{2\sqrt{z}}{1+z}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{1-z}}{2\sqrt{z-1}}$$

Involving $\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)$ and $\tanh^{-1}\left(\sqrt{z}\right)$

01.28.27.2735.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\tanh^{-1}\left(\sqrt{z}\right) /; |z| < 1$$

01.28.27.2736.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\tanh^{-1}\left(\sqrt{z}\right) - \pi i /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.2737.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\tanh^{-1}\left(\sqrt{z}\right) + \pi i /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.2738.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\tanh^{-1}\left(\sqrt{z}\right) + \frac{\pi\sqrt{-z^2}}{z} /; |z| > 1$$

01.28.27.2739.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == \frac{\pi\sqrt{-z}}{2\sqrt{z}}\left(\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2} + 1\right) + 2\tanh^{-1}\left(\sqrt{z}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)$ and $\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.2740.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi i /; |z| < 1 \land \operatorname{Im}(z) \geq 0$$

01.28.27.2741.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.2742.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) + \pi\sqrt{-\frac{1}{z}}\sqrt{z} /; |z| < 1$$

01.28.27.2743.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == 2\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; |z| > 1$$

01.28.27.2744.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) == \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}\left(\frac{1-z}{1+z}\sqrt{\left(\frac{z+1}{z-1}\right)^2} + 1\right) + 2\tanh^{-1}\left(\frac{1}{\sqrt{z}}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)$ and $\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.2745.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi i \;/;\; |z| < 1 \bigwedge 0 \le \arg(z) < \pi$$

01.28.27.2746.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.2747.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = -2\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi i \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2748.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) + \pi\sqrt{-\frac{1}{z}}\sqrt{z} \;/;\; |z| < 1$$

01.28.27.2749.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; |z| > 1 \bigwedge |\arg(z)| < \pi$$

01.28.27.2750.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = -2\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2751.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; |z| > 1$$

01.28.27.2752.01

$$\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right) = \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}\left(\frac{1-z}{1+z}\sqrt{\left(\frac{z+1}{z-1}\right)^2} + 1\right) + 2\sqrt{z}\sqrt{\frac{1}{z}}\tanh^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; |z| \ne 1$$

Involving $\coth^{-1}\left(\sqrt{z^2-1} + c\,z\right)$

Involving $\coth^{-1}\left(\sqrt{z^2-1} + z\right)$ and $\tanh^{-1}(z)$

01.28.27.2753.01

$$\coth^{-1}\left(\sqrt{z^2-1} + z\right) = \frac{1}{2}\tanh^{-1}(z) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \frac{\pi}{2} \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.2754.01

$$\coth^{-1}\left(\sqrt{z^2-1} + z\right) = \frac{1}{2}\tanh^{-1}(z) + \frac{\pi i}{4} \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2755.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = \frac{1}{2}\tanh^{-1}(z) - \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}+z\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2756.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2757.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = \frac{\pi i}{2} + \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2758.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{\pi i}{2} + \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2759.01

$$\coth^{-1}\left(\sqrt{z^2-1}+z\right) = -\frac{\pi\sqrt{-z-1}\left(z-\sqrt{z^2}\right)}{4\sqrt{z+1}\,z} + \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}-z\right)$ and $\tanh^{-1}(z)$

01.28.27.2760.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{1}{2}\tanh^{-1}(z) - \frac{\pi i}{4} /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.2761.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{1}{2}\tanh^{-1}(z) + \frac{\pi i}{4} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1) \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2762.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{1}{2}\tanh^{-1}(z) - \frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\sqrt{z^2-1}-z\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2763.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{\pi i}{2} - \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2764.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right) = -\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2765.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right)=\frac{\pi i}{2}-\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right)/;-\frac{\pi}{2}<\arg(z)<0\bigvee(z\in\mathbb{R}\land z>1)$$

01.28.27.2766.01

$$\coth^{-1}\left(\sqrt{z^2-1}-z\right)=-\frac{\pi\sqrt{z-1}}{4\sqrt{1-z}\,z}\left(z+\sqrt{z^2}\right)-\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+c\,z}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)$ and $\tanh^{-1}(z)$

01.28.27.2767.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)=\frac{1}{2}\tanh^{-1}(z)+\frac{\pi i}{4}/;0<\arg(z)\le\frac{\pi}{2}\bigvee-\pi<\arg(z)\le-\frac{\pi}{2}\bigvee(z\in\mathbb{R}\land-1<z<1)$$

01.28.27.2768.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)=\frac{1}{2}\tanh^{-1}(z)-\frac{\pi i}{4}/;\frac{\pi}{2}<\arg(z)<\pi\bigvee-\frac{\pi}{2}<\arg(z)<0\bigvee(z\in\mathbb{R}\land z<-1)\bigvee(z\in\mathbb{R}\land z>1)$$

01.28.27.2769.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)=\frac{1}{2}\tanh^{-1}(z)+\frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2770.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)=\frac{\pi i}{2}+\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right)/;0<\arg(z)\le\frac{\pi}{2}\bigvee(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.2771.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)=\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right)/;\frac{\pi}{2}<\arg(z)\le\pi\bigvee-\pi<\arg(z)\le-\frac{\pi}{2}$$

01.28.27.2772.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right)=-\frac{\pi i}{2}+\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right)/;-\frac{\pi}{2}<\arg(z)<0\bigvee(z\in\mathbb{R}\land z>1)$$

01.28.27.2773.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}+z}\right) = \frac{\pi\sqrt{z-1}}{4\sqrt{1-z}\,z}\left(z+\sqrt{z^2}\right)+\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right)$ and $\tanh^{-1}(z)$

01.28.27.2774.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{1}{2}\tanh^{-1}(z)+\frac{\pi i}{4} \;/;\; 0<\arg(z)\leq\frac{\pi}{2}\bigvee -\pi<\arg(z)\leq-\frac{\pi}{2}\bigvee (z\in\mathbb{R}\land -1<z<1)$$

01.28.27.2775.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{1}{2}\tanh^{-1}(z)-\frac{\pi i}{4} \;/;\; \frac{\pi}{2}<\arg(z)<\pi\bigvee -\frac{\pi}{2}<\arg(z)<0\bigvee (z\in\mathbb{R}\land z<-1)\bigvee (z\in\mathbb{R}\land z>1)$$

01.28.27.2776.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{1}{2}\tanh^{-1}(z)+\frac{\pi\sqrt{z^2-1}}{4\sqrt{1-z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2777.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2}<\arg(z)\leq\frac{\pi}{2}$$

01.28.27.2778.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = -\frac{\pi i}{2}-\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; \frac{\pi}{2}<\arg(z)<\pi\bigvee (z\in\mathbb{R}\land z<-1)$$

01.28.27.2779.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{\pi i}{2}-\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) \;/;\; -\pi<\arg(z)\leq-\frac{\pi}{2}\bigvee (z\in\mathbb{R}\land -1<z<0)$$

01.28.27.2780.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z^2-1}-z}\right) = \frac{\pi\sqrt{-z-1}\left(z-\sqrt{z^2}\right)}{4\sqrt{z+1}\,z}-\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right)$ and $\tanh^{-1}(z)$

01.28.27.2781.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{1}{2}\tanh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2782.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2783.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2784.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}+1}{z}\right) = \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi z \sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right)$ and $\tanh^{-1}(z)$

01.28.27.2785.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = \frac{\pi i}{2} - \frac{1}{2}\tanh^{-1}(z) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2786.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{\pi i}{2} - \frac{1}{2}\tanh^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2787.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{1}{2}\tanh^{-1}(z) + \frac{\pi z \sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2788.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2789.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2790.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}-1}{z}\right) = -\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi z\sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right)$ and $\tanh^{-1}(z)$

01.28.27.2791.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = -\frac{\pi i}{2} + \frac{1}{2}\tanh^{-1}(z) \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2792.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{\pi i}{2} + \frac{1}{2}\tanh^{-1}(z) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2793.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{1}{2}\tanh^{-1}(z) - \frac{\pi z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2794.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2795.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2796.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}+1}\right) = \frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi z \sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right)$ and $\tanh^{-1}(z)$

01.28.27.2797.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{1}{2}\tanh^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right)$ and $\tanh^{-1}\left(\frac{1}{z}\right)$

01.28.27.2798.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2799.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2800.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1-z^2}-1}\right) = -\frac{1}{2}\tanh^{-1}\left(\frac{1}{z}\right) - \frac{\pi z \sqrt{z^2-1}}{4\sqrt{z^2-z^4}}$$

Involving csch^{-1}

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\frac{1-z^2}{2z}\right)$

01.28.27.2801.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z^2}{2z}\right) \;/;\; |z| < 1 \bigwedge 0 \le \arg(z) < \pi$$

01.28.27.2802.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z^2}{2z}\right) \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2803.01

$$\coth^{-1}(z) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z^2}{2z}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}} \;/;\; |z| < 1$$

01.28.27.2804.01

$$\coth^{-1}(z) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z^2}{2z}\right) /;\; |z| > 1$$

01.28.27.2805.01

$$\coth^{-1}(z) = \frac{1}{4}\pi\left(\frac{z-i}{z+i}\sqrt{\left(\frac{z+i}{z-i}\right)^2} - 1\right)\sqrt{-\frac{1}{z^2}}\, z - \frac{z-i}{2(z+i)}\sqrt{\left(\frac{z+i}{z-i}\right)^2}\operatorname{csch}^{-1}\left(\frac{1-z^2}{2z}\right) /;\; |z| \neq 1$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\frac{z^2-1}{2z}\right)$

01.28.27.2806.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z^2-1}{2z}\right) /;\; |z| < 1 \bigwedge 0 \leq \arg(z) < \pi$$

01.28.27.2807.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z^2-1}{2z}\right) /;\; |z| < 1 \land \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2808.01

$$\coth^{-1}(z) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z^2-1}{2z}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}} \;/;\; |z| < 1$$

01.28.27.2809.01

$$\coth^{-1}(z) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z^2-1}{2z}\right) /;\; |z| > 1$$

01.28.27.2810.01

$$\coth^{-1}(z) = \frac{z-i}{2(z+i)}\sqrt{\left(\frac{z+i}{z-i}\right)^2}\operatorname{csch}^{-1}\left(\frac{z^2-1}{2z}\right) + \frac{\pi z}{4}\left(\frac{z-i}{z+i}\sqrt{\left(\frac{z+i}{z-i}\right)^2} - 1\right)\sqrt{-\frac{1}{z^2}} \;/;\; |z| \neq 1$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\frac{i(1-z^2)}{1+z^2}\right)$

01.28.27.2811.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(1-z^2)}{1+z^2}\right) /;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2812.01

$$\coth^{-1}(z) = \frac{\pi i}{4} - \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(1-z^2)}{1+z^2}\right) /;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.2813.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} - \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(1-z^2)}{1+z^2}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2814.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(1-z^2)}{1+z^2}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2815.01

$$\coth^{-1}(z) = \frac{1}{4} i\pi\left(i\sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right) + \frac{i\sqrt{-z^2}\sqrt{1-z^2}}{2z}\sqrt{\frac{1}{1-z^2}}\operatorname{csch}^{-1}\left(\frac{i(1-z^2)}{1+z^2}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\frac{i(z^2-1)}{z^2+1}\right)$

01.28.27.2816.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} - \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(z^2-1)}{z^2+1}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2817.01

$$\coth^{-1}(z) = \frac{\pi i}{4} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(z^2-1)}{z^2+1}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.2818.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(z^2-1)}{z^2+1}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2819.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} - \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(z^2-1)}{z^2+1}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2820.01

$$\coth^{-1}(z) = \frac{1}{4} i\pi\left(i\sqrt{-\frac{1}{z^2}}\, z + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right) - \frac{i\sqrt{-z^2}\sqrt{1-z^2}}{2z}\sqrt{\frac{1}{1-z^2}}\operatorname{csch}^{-1}\left(\frac{i(z^2-1)}{z^2+1}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\sqrt{z^2-1}\right)$

01.28.27.2821.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\sqrt{z^2-1}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2822.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\sqrt{z^2-1}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2823.01

$$\coth^{-1}(z) = -\pi i - \operatorname{csch}^{-1}\left(\sqrt{z^2-1}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2824.01

$$\coth^{-1}(z) = \pi i + \operatorname{csch}^{-1}\left(\sqrt{z^2 - 1}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2825.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right) + z\sqrt{\frac{1}{z^2}}\sqrt{z^2-1}\sqrt{\frac{1}{z^2-1}}\operatorname{csch}^{-1}\left(\sqrt{z^2-1}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right)$

01.28.27.2826.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2827.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2828.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.2829.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2830.01

$$\coth^{-1}(z) = \sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}}\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{z}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right)$

01.28.27.2831.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2832.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2833.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.2834.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge -1 < z < 0)$$

01.28.27.2835.01

$$\coth^{-1}(z) = \frac{\sqrt{z^2}\sqrt{1-z^2}}{z}\sqrt{\frac{1}{1-z^2}}\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{z^2}}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right)$

01.28.27.2836.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2837.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \wedge z < 0)$$

01.28.27.2838.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \wedge z > 0)$$

01.28.27.2839.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2840.01

$$\coth^{-1}(z) = \frac{z\sqrt{z^2-1}}{\sqrt{-z^2}}\sqrt{\frac{1}{1-z^2}}\operatorname{csch}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{-z^2}}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right)$

01.28.27.2841.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2842.01

$$\coth^{-1}(z) = \operatorname{csch}^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2843.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2844.01

$$\coth^{-1}(z) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2845.01

$$\coth^{-1}(z) = z \sqrt{\frac{1-z^2}{z^2}} \sqrt{\frac{1}{1-z^2}} \operatorname{csch}^{-1}\left(\sqrt{\frac{1-z^2}{z^2}}\right) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\sqrt{2}\,(1-z^2)^{1/4} \middle/ \sqrt{-\sqrt{1-z^2}-1}\right)$

01.28.27.2846.01

$$\coth^{-1}(z) = -2 \operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{-\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2} /; 0 < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.2847.01

$$\coth^{-1}(z) = -2 \operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{-\sqrt{1-z^2}-1}}\right) - \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2848.01

$$\coth^{-1}(z) = 2 \operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{-\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2849.01

$$\coth^{-1}(z) = 2\,\text{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{-\sqrt{1-z^2}-1}}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2850.01

$$\coth^{-1}(z) = -\frac{2\sqrt{-z}\,\sqrt{z^2-1}}{\sqrt{z}\,\sqrt{1-z^2}}\,\text{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{-\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\,\sqrt{\frac{z}{z+1}} - \frac{i\sqrt{z}}{\sqrt{-z}}\right)$$

Involving $\coth^{-1}(z)$ and $\text{csch}^{-1}\left(\sqrt{2}\,(1-z^2)^{1/4} \Big/ \sqrt{1-\sqrt{1-z^2}}\right)$

01.28.27.2851.01

$$\coth^{-1}(z) = 2\,\text{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{1-\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2852.01

$$\coth^{-1}(z) = 2\,\text{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{1-\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2853.01

$$\coth^{-1}(z) = -2\,\text{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{1-\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2854.01

$$\coth^{-1}(z) = -2\,\text{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{1-\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2855.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(i\sqrt{-\frac{1}{z^2}}\,z - \sqrt{\frac{1}{1-z}}\,\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\,\sqrt{z+1}\right) + \frac{2\sqrt{z^2}}{z}\,\text{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{1-\sqrt{1-z^2}}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\sqrt{-2\sqrt{1-z^2}\Big/\left(\sqrt{1-z^2}+1\right)}\right)$

01.28.27.2856.01

$$\coth^{-1}(z) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right)+\frac{\pi i}{2} \;/;\; 0<\arg(z)\leq\frac{\pi}{2}$$

01.28.27.2857.01

$$\coth^{-1}(z) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right)-\frac{\pi i}{2} \;/;\; -\frac{\pi}{2}<\arg(z)<0\bigvee(z\in\mathbb{R}\land z>1)$$

01.28.27.2858.01

$$\coth^{-1}(z) = -2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right)+\frac{\pi i}{2} \;/;\; \frac{\pi}{2}<\arg(z)<\pi\bigvee(z\in\mathbb{R}\land z<-1)$$

01.28.27.2859.01

$$\coth^{-1}(z) = -2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right)-\frac{\pi i}{2} \;/;\; -\pi<\arg(z)\leq-\frac{\pi}{2}$$

01.28.27.2860.01

$$\coth^{-1}(z) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right)+\frac{3\pi i}{2} \;/;\; (z\in\mathbb{R}\land -1<z<0)$$

01.28.27.2861.01

$$\coth^{-1}(z) = -2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right)-\frac{3\pi i}{2} \;/;\; (z\in\mathbb{R}\land 0<z<1)$$

01.28.27.2862.01

$$\coth^{-1}(z) = \frac{2\sqrt{-z}\sqrt{z^2-1}}{\sqrt{(1-z)z}\sqrt{z+1}}\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right)+\frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}-\sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}-\frac{i\sqrt{z}}{\sqrt{-z}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\sqrt{2\sqrt{1-z^2}\Big/\left(1-\sqrt{1-z^2}\right)}\right)$

01.28.27.2863.01

$$\coth^{-1}(z) = 2\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{1-\sqrt{1-z^2}}}\right)-\frac{\pi i}{2} \;/;\; 0<\arg(z)<\frac{\pi}{2}\bigvee(z\in\mathbb{R}\land 0<z<1)$$

01.28.27.2864.01

$$\coth^{-1}(z) = 2\,\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{1-\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.2865.01

$$\coth^{-1}(z) = -2\,\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{1-\sqrt{1-z^2}}}\right) - \frac{\pi i}{2} /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.2866.01

$$\coth^{-1}(z) = -2\,\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{1-\sqrt{1-z^2}}}\right) + \frac{\pi i}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2867.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(i\sqrt{-\frac{1}{z^2}}\,z - \sqrt{\frac{1}{1-z}}\,\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\,\sqrt{z+1}\right) + 2z\sqrt{\frac{1}{z^2}}\,\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{1-\sqrt{1-z^2}}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\sqrt{2}\,(z^2-1)^{1/4} \big/ \sqrt{-\sqrt{z^2-1}-z}\right)$

01.28.27.2868.01

$$\coth^{-1}(z) = -2\,\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{-\sqrt{z^2-1}-z}}\right) - \pi i /; 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2869.01

$$\coth^{-1}(z) = -2\,\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{-\sqrt{z^2-1}-z}}\right) + \pi i /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2870.01

$$\coth^{-1}(z) = -2\,\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{-\sqrt{z^2-1}-z}}\right) /; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.2871.01

$$\coth^{-1}(z) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{-\sqrt{z^2-1}-z}}\right) - \pi\,i\;/;\;(z \in \mathbb{R} \land z > 1)$$

01.28.27.2872.01

$$\coth^{-1}(z) = -2\sqrt{\frac{1}{1-z}}\,\sqrt{1-z}\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{-\sqrt{z^2-1}-z}}\right) - \frac{\pi\left(z+\sqrt{z^2}\right)}{2\sqrt{z}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(z)$ and $\mathrm{csch}^{-1}\left(\sqrt{2}\,(z^2-1)^{1/4}\Big/\sqrt{z-\sqrt{z^2-1}}\right)$

01.28.27.2873.01

$$\coth^{-1}(z) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{z-\sqrt{z^2-1}}}\right)\;/;\;-\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.28.27.2874.01

$$\coth^{-1}(z) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{z-\sqrt{z^2-1}}}\right) - \pi\,i\;/;\;\frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2875.01

$$\coth^{-1}(z) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{z-\sqrt{z^2-1}}}\right) + \pi\,i\;/;\;-\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2876.01

$$\coth^{-1}(z) = -2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{z-\sqrt{z^2-1}}}\right) + \pi\,i\;/;\;(z \in \mathbb{R} \land z < -1)$$

01.28.27.2877.01

$$\coth^{-1}(z) = \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1-\frac{\sqrt{z^2}}{z}\right) + 2\sqrt{\frac{1}{1+z}}\,\sqrt{1+z}\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{z-\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\sqrt{-2\sqrt{z^2-1}\,\big/\left(\sqrt{z^2-1}+z\right)}\right)$

01.28.27.2878.01

$$\coth^{-1}(z) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{z^2-1}}{z+\sqrt{z^2-1}}}\right) - \pi\, i \;/;\; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2879.01

$$\coth^{-1}(z) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{z^2-1}}{z+\sqrt{z^2-1}}}\right) + \pi\, i \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.2880.01

$$\coth^{-1}(z) = -2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{z^2-1}}{z+\sqrt{z^2-1}}}\right) /;\; \frac{\pi}{2} < \arg(z) \le \pi \bigvee -\pi < \arg(z) \le -\frac{\pi}{2}$$

01.28.27.2881.01

$$\coth^{-1}(z) = -2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{z^2-1}}{z+\sqrt{z^2-1}}}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land z > 1) \lor (i\, z \in \mathbb{R} \land i\, z < 0)$$

01.28.27.2882.01

$$\coth^{-1}(z) = -\frac{\pi\sqrt{z}}{2}\left(1+\frac{\sqrt{z^2}}{z}\right)\sqrt{-\frac{1}{z}} + 2\, i\sqrt{-\frac{i}{z}}\sqrt{-i\, z}\sqrt{1-z}\sqrt{\frac{1}{1-z}}\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{z^2-1}}{z+\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{csch}^{-1}\left(\sqrt{2\sqrt{z^2-1}\,\big/\left(z-\sqrt{z^2-1}\right)}\right)$

01.28.27.2883.01

$$\coth^{-1}(z) = 2\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{z-\sqrt{z^2-1}}}\right) /;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.28.27.2884.01

$$\coth^{-1}(z) = -2\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{z-\sqrt{z^2-1}}}\right) - \pi\, i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.2885.01

$$\coth^{-1}(z) = -2\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{z-\sqrt{z^2-1}}}\right) + \pi\, i \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.2886.01

$$\coth^{-1}(z) = 2\,\text{csch}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{z-\sqrt{z^2-1}}}\right) + \pi\,i\;/;\;(z \in \mathbb{R} \land z < -1) \lor (i\,z \in \mathbb{R} \land i\,z > 0)$$

01.28.27.2887.01

$$\coth^{-1}(z) = \frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}\left(1 - \frac{\sqrt{z^2}}{z}\right) - 2\,i\sqrt{\frac{i}{z}}\sqrt{i\,z}\sqrt{\frac{1}{z+1}}\sqrt{z+1}\,\text{csch}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{z-\sqrt{z^2-1}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\text{csch}^{-1}\left(\frac{i(1-z)}{1+z}\right)$

01.28.27.2888.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\,\text{csch}^{-1}\left(\frac{i\,(1-z)}{z+1}\right) - \frac{\pi\,i}{4}\;/;\;0 < \arg(z) \le \pi \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2889.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\,\text{csch}^{-1}\left(\frac{i\,(1-z)}{1+z}\right) + \frac{\pi\,i}{4}\;/;\;\text{Im}(z) < 0$$

01.28.27.2890.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\,\text{csch}^{-1}\left(\frac{i\,(1-z)}{1+z}\right) - \frac{3\,\pi\,i}{4}\;/;\;(z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2891.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi\,i}{4}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + i\sqrt{z}\sqrt{-\frac{1}{z}} - 1\right) + \frac{i\sqrt{1-z}\sqrt{-z^2}}{2\,z}\sqrt{\frac{1}{1-z}}\,\text{csch}^{-1}\left(\frac{i\,(1-z)}{1+z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\text{csch}^{-1}\left(\frac{i(z-1)}{z+1}\right)$

01.28.27.2892.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\,\text{csch}^{-1}\left(\frac{i\,(z-1)}{z+1}\right) - \frac{\pi\,i}{4}\;/;\;0 < \arg(z) \le \pi \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2893.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\,\text{csch}^{-1}\left(\frac{i\,(z-1)}{z+1}\right) + \frac{\pi\,i}{4}\;/;\;\text{Im}(z) < 0$$

01.28.27.2894.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\,\text{csch}^{-1}\left(\frac{i\,(z-1)}{z+1}\right) - \frac{3\,\pi\,i}{4}\;/;\;(z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2895.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi\,i}{4}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + i\sqrt{z}\sqrt{-\frac{1}{z}} - 1\right) - \frac{i\sqrt{1-z}\sqrt{-z^2}}{2\,z}\sqrt{\frac{1}{1-z}}\,\text{csch}^{-1}\left(\frac{i\,(z-1)}{z+1}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right)$

01.28.27.2896.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; |z| < 1 \land \operatorname{Im}(z) \geq 0$$

01.28.27.2897.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) + \frac{\pi i}{2} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.2898.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) - \frac{1}{2}(\pi\sqrt{z})\sqrt{-\frac{1}{z}} \;/;\; |z| < 1$$

01.28.27.2899.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) \;/;\; |z| > 1$$

01.28.27.2900.01

$$\coth^{-1}(\sqrt{z}) = -\frac{\pi\sqrt{z}}{4}\sqrt{-\frac{1}{z}}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) + \frac{1+z}{2(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right)$

01.28.27.2901.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; |z| < 1 \land \operatorname{Im}(z) \geq 0$$

01.28.27.2902.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) + \frac{\pi i}{2} \;/;\; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.2903.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) - \frac{1}{2}(\pi\sqrt{z})\sqrt{-\frac{1}{z}} \;/;\; |z| < 1$$

01.28.27.2904.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) \;/;\; |z| > 1$$

01.28.27.2905.01

$$\coth^{-1}(\sqrt{z}) = -\frac{\pi\sqrt{z}}{4}\sqrt{-\frac{1}{z}}\left(\frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2} + 1\right) - \frac{1+z}{2(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{csch}^{-1}(\sqrt{z-1})$

01.28.27.2906.01

$$\coth^{-1}\left(\sqrt{z}\right) = \operatorname{csch}^{-1}\left(\sqrt{z-1}\right) /; z \notin (0, 1)$$

01.28.27.2907.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\operatorname{csch}^{-1}\left(\sqrt{z-1}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2908.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - 1\right) + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} \operatorname{csch}^{-1}\left(\sqrt{z-1}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right)$

01.28.27.2909.01

$$\coth^{-1}\left(\sqrt{z}\right) = \operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2910.01

$$\coth^{-1}\left(\sqrt{z}\right) = \operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.2911.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2912.01

$$\coth^{-1}\left(\sqrt{z}\right) = \sqrt{\frac{1}{1-z}}\sqrt{1-z} \operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right)$

01.28.27.2913.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.2914.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.2915.01

$$\coth^{-1}\left(\sqrt{z}\right) = \operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z > 0)$$

01.28.27.2916.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\sqrt{-1+z}}{\sqrt{-z}}\sqrt{\frac{z}{1-z}} \operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right)$

01.28.27.2917.01

$$\coth^{-1}(\sqrt{z}) = \operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2918.01

$$\coth^{-1}(\sqrt{z}) = \operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.2919.01

$$\coth^{-1}(\sqrt{z}) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right) - \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0) \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2920.01

$$\coth^{-1}(\sqrt{z}) = \sqrt{\frac{1-z}{z}} \sqrt{\frac{z}{1-z}} \operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{csch}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \big/ \sqrt{-\sqrt{1-z}-1}\right)$

01.28.27.2921.01

$$\coth^{-1}(\sqrt{z}) = -2 \operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-1}}\right) + \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi$$

01.28.27.2922.01

$$\coth^{-1}(\sqrt{z}) = -2 \operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-1}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2923.01

$$\coth^{-1}(\sqrt{z}) = 2 \operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-1}}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2924.01

$$\coth^{-1}(\sqrt{z}) = -2 \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} \operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-1}}\right) - \pi \left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} + \frac{\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{csch}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \big/ \sqrt{1-\sqrt{1-z}}\right)$

01.28.27.2925.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{1-\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \leq \pi \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2926.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{1-\sqrt{1-z}}}\right) + \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2927.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{1-\sqrt{1-z}}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\mathrm{csch}^{-1}\left(\sqrt{-2\sqrt{1-z}\,/\left(\sqrt{1-z}+1\right)}\right)$

01.28.27.2928.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.2929.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2930.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,\mathrm{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{3\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2931.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\;\mathrm{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \pi\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} + \frac{\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\mathrm{csch}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(1-\sqrt{1-z}\right)}\right)$

01.28.27.2932.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{1-\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2933.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{1-\sqrt{1-z}}}\right) + \frac{\pi\,i}{2} \;/;\; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2934.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,\mathrm{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{1-\sqrt{1-z}}}\right) - \frac{\pi\, i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.2935.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\mathrm{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{1-\sqrt{1-z}}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\mathrm{csch}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \Big/ \sqrt{-\sqrt{1-z}-\sqrt{-z}}\right)$

01.28.27.2936.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right) - \pi\, i \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.2937.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right) + \pi\, i \;/;\; \mathrm{Im}(z) < 0$$

01.28.27.2938.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2939.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2940.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi\, i}{2}\left(1 + 2\, i\sqrt{z}\,\sqrt{-\frac{1}{z}} - \sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}}\right) + 2\sqrt{1-z}\,\sqrt{\frac{1}{1-z}}\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\mathrm{csch}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \Big/ \sqrt{\sqrt{-z}-\sqrt{1-z}}\right)$

01.28.27.2941.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{-z}-\sqrt{1-z}}}\right) \;/;\; z \notin (-\infty, 1)$$

01.28.27.2942.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{-z}-\sqrt{1-z}}}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2943.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{-z}-\sqrt{1-z}}}\right) /;\ (z\in\mathbb{R}\land z<0)$$

01.28.27.2944.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}-1\right)\frac{\pi i}{2}+2\sqrt{\frac{1}{z}}\sqrt{z}\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{-z}-\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}+\sqrt{-z}\right)}\right)$

01.28.27.2945.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)-\pi i /;\ \operatorname{Im}(z)>0$$

01.28.27.2946.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)+\pi i /;\ \operatorname{Im}(z)<0$$

01.28.27.2947.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) /;\ (z\in\mathbb{R}\land 0<z<1)$$

01.28.27.2948.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)-\pi i /;\ (z\in\mathbb{R}\land z>1)\lor(z\in\mathbb{R}\land z<0)$$

01.28.27.2949.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sqrt{\frac{z}{1-z}}\sqrt{\frac{1-z}{z}}\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)+\left(1+2i\sqrt{z}\sqrt{-\frac{1}{z}}-\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right)\frac{\pi i}{2}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{-z}-\sqrt{1-z}\right)}\right)$

01.28.27.2950.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{-z}-\sqrt{1-z}}}\right) /;\ z\notin(0,1)$$

01.28.27.2951.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{-z}-\sqrt{1-z}}}\right)-\pi i /;\ (z\in\mathbb{R}\land 0<z<1)$$

01.28.27.2952.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z}{z-1}}\,\sqrt{\frac{z-1}{z}} - 1\right)\frac{\pi i}{2} + 2\operatorname{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{-z}-\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{i(1-z)}{1+z}\right)$

01.28.27.2953.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(1-z)}{1+z}\right) + \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.2954.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(1-z)}{1+z}\right) - \frac{\pi i}{4} \;/;\; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2955.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(1-z)}{1+z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2956.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right) + \frac{i\sqrt{-z}\,\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\operatorname{csch}^{-1}\left(\frac{i(1-z)}{1+z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{i(z-1)}{z+1}\right)$

01.28.27.2957.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(z-1)}{z+1}\right) + \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.2958.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(z-1)}{z+1}\right) - \frac{\pi i}{4} \;/;\; -\pi < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2959.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i(z-1)}{z+1}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2960.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} + \frac{i\sqrt{-z}}{\sqrt{z}} - 1\right) - \frac{i\sqrt{-z}\,\sqrt{1-z}}{2\sqrt{z}}\sqrt{\frac{1}{1-z}}\operatorname{csch}^{-1}\left(\frac{i(z-1)}{z+1}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right)$

01.28.27.2961.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) /; |z| < 1$$

01.28.27.2962.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} - \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.2963.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{2} - \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.2964.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) - \frac{\pi\sqrt{-z^2}}{2z} /; |z| > 1$$

01.28.27.2965.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi\sqrt{-z^2}}{4z}\left(1 - \frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right) + \frac{1+z}{2(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\operatorname{csch}^{-1}\left(\frac{1-z}{2\sqrt{z}}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right)$

01.28.27.2966.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) /; |z| < 1$$

01.28.27.2967.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) /; |z| > 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.2968.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{2} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.2969.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) - \frac{\pi\sqrt{-z^2}}{2z} /; |z| > 1$$

01.28.27.2970.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi\sqrt{-z^2}}{4z}\left(1 - \frac{1+z}{1-z}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\right) - \frac{1+z}{2(1-z)}\sqrt{\left(\frac{1-z}{1+z}\right)^2}\operatorname{csch}^{-1}\left(\frac{z-1}{2\sqrt{z}}\right) /; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{z-1}\right)$

01.28.27.2971.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\sqrt{z-1}\right) + \frac{\pi i}{2} \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.2972.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\sqrt{z-1}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2973.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\operatorname{csch}^{-1}\left(\sqrt{z-1}\right) - \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2974.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}}\,\operatorname{csch}^{-1}\left(\sqrt{z-1}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right)$

01.28.27.2975.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right) \;/;\; z \notin (1, \infty)$$

01.28.27.2976.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2977.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - 1\right) + \sqrt{\frac{1}{1-z}}\,\sqrt{1-z}\,\operatorname{csch}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right)$

01.28.27.2978.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right) \;/;\; z \notin (0, \infty)$$

01.28.27.2979.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right) \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2980.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.2981.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}}-1\right)\frac{\pi i}{2} - \sqrt{-\frac{1}{z}}\,\sqrt{-z}\,\operatorname{csch}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right)$

01.28.27.2982.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right) /;\ z \notin (-\infty, 0) \bigwedge z \notin (1, \infty)$$

01.28.27.2983.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right) /;\ (z \in \mathbb{R} \land z < 0)$$

01.28.27.2984.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right) - \pi i /;\ (z \in \mathbb{R} \land z > 1)$$

01.28.27.2985.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}}-1\right) + \sqrt{\frac{z}{1-z}}\,\sqrt{\frac{1-z}{z}}\,\operatorname{csch}^{-1}\left(\sqrt{\frac{1-z}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \middle/ \sqrt{-\sqrt{1-z}-1}\right)$

01.28.27.2986.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-1}}\right) + \pi i /;\ 0 < \arg(z) \le \pi$$

01.28.27.2987.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-1}}\right) - \pi i /;\ \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2988.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-1}}\right) - \pi i /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2989.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\sqrt{\frac{z}{z-1}}\,\sqrt{\frac{z-1}{z}}\,\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-1}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \middle/ \sqrt{1-\sqrt{1-z}}\right)$

01.28.27.2990.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\text{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{1-\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\text{csch}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}+1\right)}\right)$

01.28.27.2991.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\text{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) + \pi\,i\;/;\;0 < \arg(z) \leq \pi$$

01.28.27.2992.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\text{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \pi\,i\;/;\;\text{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.2993.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,\text{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \pi\,i\;/;\;(z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.2994.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\,\text{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\text{csch}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(1-\sqrt{1-z}\right)}\right)$

01.28.27.2995.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\text{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{1-\sqrt{1-z}}}\right)\;/;\;|\arg(z)| < \pi$$

01.28.27.2996.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,\text{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{1-\sqrt{1-z}}}\right)\;/;\;(z \in \mathbb{R} \land z < 0)$$

01.28.27.2997.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{z}\sqrt{\frac{1}{z}}\,\text{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{1-\sqrt{1-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\text{csch}^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{-\sqrt{1-z}-\sqrt{-z}}\right)$

01.28.27.2998.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi\, i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.2999.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\, i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3000.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{3\pi\, i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.3001.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{1-z}\,\sqrt{\frac{1}{1-z}}\,\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{-\sqrt{1-z}-\sqrt{-z}}}\right) + \left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - \frac{i\sqrt{-z^2}}{2z} - 1\right)\pi\, i$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \middle/ \sqrt{\sqrt{-z}-\sqrt{1-z}}\right)$

01.28.27.3002.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{-z}-\sqrt{1-z}}}\right) + \frac{\pi\, i}{2} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.3003.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{-z}-\sqrt{1-z}}}\right) - \frac{\pi\, i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.3004.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{-z}-\sqrt{1-z}}}\right) + \frac{\pi\, i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3005.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\operatorname{csch}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{-z}-\sqrt{1-z}}}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{2\sqrt{1-z} \,/\left(\sqrt{1-z}+\sqrt{-z}\right)}\right)$

01.28.27.3006.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\operatorname{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi\, i}{2} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.3007.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\text{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi\,i}{2} \;/;\; \text{Im}(z) < 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3008.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,\text{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{3\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.3009.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,\text{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi\,i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3010.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{-z^2}}{z}\left(\sqrt{1-z}\,\sqrt{\frac{1}{1-z}} - \frac{1}{2}\right) + 2\sqrt{\frac{1-z}{z}}\,\sqrt{\frac{z}{1-z}}\,\text{csch}^{-1}\left(\sqrt{-\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\text{csch}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{-z}-\sqrt{1-z}\right)}\right)$

01.28.27.3011.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\text{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{-z}-\sqrt{1-z}}}\right) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) \le \pi$$

01.28.27.3012.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\text{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{-z}-\sqrt{1-z}}}\right) - \frac{\pi\,i}{2} \;/;\; -\pi < \arg(z) \le 0$$

01.28.27.3013.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\text{csch}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{-z}-\sqrt{1-z}}}\right) - \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\sqrt{1+z}\right)$

Involving $\coth^{-1}\left(\sqrt{1+z}\right)$ and $\text{csch}^{-1}\left(\sqrt{z}\right)$

01.28.27.3014.01

$$\coth^{-1}\left(\sqrt{1+z}\right) = \text{csch}^{-1}\left(\sqrt{z}\right) \;/;\; z \notin (-1,\,0)$$

01.28.27.3015.01

$$\coth^{-1}\left(\sqrt{1+z}\right) = -\text{csch}^{-1}\left(\sqrt{z}\right) - \pi\,i \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3016.01

$$\coth^{-1}\left(\sqrt{1+z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}-1\right)+\frac{\sqrt{z}\sqrt{-z-1}}{\sqrt{-z}\sqrt{z+1}}\operatorname{csch}^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{z}\right)$

01.28.27.3017.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = \frac{\pi i}{2}+\operatorname{csch}^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.3018.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\frac{\pi i}{2}+\operatorname{csch}^{-1}\left(\sqrt{z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.3019.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\frac{\pi i}{2}-\operatorname{csch}^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3020.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z}}\right) = -\frac{\sqrt{-z-1}\sqrt{-z}}{\sqrt{z+1}\sqrt{z}}\operatorname{csch}^{-1}\left(\sqrt{z}\right)-\frac{\pi\sqrt{-z-1}}{2\sqrt{z+1}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{z}\right)$

01.28.27.3021.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = \frac{\pi i}{2}+\operatorname{csch}^{-1}\left(\sqrt{z}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.3022.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = -\frac{\pi i}{2}+\operatorname{csch}^{-1}\left(\sqrt{z}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.3023.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = -\frac{\pi i}{2}-\operatorname{csch}^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3024.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z}}\right) = -\frac{\sqrt{-z-1}\,\sqrt{-z}}{\sqrt{z}}\sqrt{\frac{1}{z+1}}\,\operatorname{csch}^{-1}\left(\sqrt{z}\right) - \frac{\pi\sqrt{-z-1}}{2}\sqrt{\frac{1}{z+1}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3025.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /;\ z \notin (-\infty, -1)$$

01.28.27.3026.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi\, i\ /;\ (z \in \mathbb{R} \land z < -1)$$

01.28.27.3027.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\, i}{2}\left(\sqrt{z+1}\,\sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3028.01

$$\coth^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{z}}\right) = \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /;\ |\arg(z)| < \pi$$

01.28.27.3029.01

$$\coth^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{z}}\right) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /;\ (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3030.01

$$\coth^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{z}}\right) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi\, i\ /;\ (z \in \mathbb{R} \land z < -1)$$

01.28.27.3031.01

$$\coth^{-1}\left(\frac{\sqrt{1+z}}{\sqrt{z}}\right) = \sqrt{z}\,\sqrt{\frac{1}{z}}\,\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\, i}{2}\left(\sqrt{z+1}\,\sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3032.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; |\arg(z)| < \pi$$

01.28.27.3033.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3034.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) = -\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3035.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) = \sqrt{\frac{z}{z+1}} \sqrt{\frac{z+1}{z}} \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2}\left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3036.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) = \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; z \notin (-\infty, -1)$$

01.28.27.3037.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3038.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{-z}}\right) = \sqrt{\frac{1}{z+1}} \sqrt{z+1} \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2}\left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3039.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; |\arg(z)| < \pi$$

01.28.27.3040.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3041.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = -\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3042.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \sqrt{\frac{z+1}{z}}\, \sqrt{\frac{z}{z+1}}\, \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi\, i}{2}\left(\sqrt{z+1}\, \sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3043.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) \;/;\; z \notin (-\infty, -1)$$

01.28.27.3044.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = -\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \pi\, i \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3045.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z}}\right) = \sqrt{z+1}\, \sqrt{\frac{1}{z+1}}\, \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi\, i}{2}\left(\sqrt{z+1}\, \sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3046.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = -\frac{\pi\, i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; \operatorname{Im}(z) \geq 0$$

01.28.27.3047.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{\pi\, i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.3048.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\, \sqrt{z}}{2}\, \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3049.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; 0 \le \arg(z) < \pi$$

01.28.27.3050.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.3051.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = -\frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3052.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z+1}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3053.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; 0 \le \arg(z) < \pi \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.3054.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.3055.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3056.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \sqrt{\frac{z+1}{z}} \sqrt{\frac{z}{z+1}} \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}} \sqrt{z+1} \sqrt{\frac{1}{z+1}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3057.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; 0 \leq \arg(z) < \pi$$

01.28.27.3058.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3059.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = -\frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3060.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{-1-z}}\right) = \sqrt{z+1}\sqrt{\frac{1}{z+1}}\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{z+1}\sqrt{\frac{1}{z+1}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3061.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) \geq 0$$

01.28.27.3062.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.3063.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right)$ and $\operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3064.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; 0 \leq \arg(z) < \pi$$

01.28.27.3065.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.3066.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = -\frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3067.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z+1}}\right) = \sqrt{z}\sqrt{\frac{1}{z}} \operatorname{csch}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z+a}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3068.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.3069.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3070.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3071.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + \frac{i\sqrt{1-z}}{2\sqrt{z-1}} - 1\right) + \frac{i\sqrt{1-z}}{2\sqrt{z-1}}\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3072.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3073.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0$$

01.28.27.3074.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.3075.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{z-1}}{2\sqrt{1-z}} - \sqrt{z}\sqrt{-\frac{1}{z}}\right) - \frac{i\sqrt{z-1}}{2\sqrt{1-z}}\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-a-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3076.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.3077.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.3078.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3079.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{\pi i}{4}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + i\sqrt{-z}\sqrt{\frac{1}{z}} - 1\right) + \frac{i\sqrt{-z-1}}{2\sqrt{z+1}}\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$$

01.28.27.3080.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{i\sqrt{-z-1}}{2\sqrt{z+1}}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{2}\left(1 - \frac{i\sqrt{-z-1}}{2\sqrt{z+1}} - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3081.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.3082.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.3083.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.3084.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{i\sqrt{-z-1}}{2\sqrt{z+1}}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{\pi}{2}\left(\frac{\sqrt{-z}\, z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\sqrt{-\frac{1}{z}} + \frac{\sqrt{-z-1}}{2\sqrt{z+1}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-a}{z+a}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3085.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.3086.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > -1)$$

01.28.27.3087.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3088.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} + \frac{i\sqrt{-z-1}}{2\sqrt{z+1}} - 1\right) + \frac{i\sqrt{-z-1}}{2\sqrt{z+1}}\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3089.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{\pi i}{4} \;/;\; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3090.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.3091.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = -\frac{1}{2}\operatorname{csch}^{-1}\left(\frac{i}{z}\right) - \frac{3\pi i}{4} \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.3092.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{\pi i}{4}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} + i\sqrt{z}\sqrt{-\frac{1}{z}} - 1\right) + \frac{i\sqrt{1-z}}{2\sqrt{z-1}}\operatorname{csch}^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{1+z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{1+z^2}\right)$ and $\operatorname{csch}^{-1}(z)$

01.28.27.3093.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = \operatorname{csch}^{-1}(z) \;/;\; \operatorname{Re}(z) > 0 \lor (i\,z \in \mathbb{R} \land i\,z < -1)$$

01.28.27.3094.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = -\operatorname{csch}^{-1}(z) \;/;\; \operatorname{Re}(z) < 0 \lor (i\,z \in \mathbb{R} \land i\,z > 1)$$

01.28.27.3095.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = -\operatorname{csch}^{-1}(z) - \pi\,i \;/;\; (i\,z \in \mathbb{R} \land -1 < i\,z < 0)$$

01.28.27.3096.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = \operatorname{csch}^{-1}(z) - \pi\,i \;/;\; (i\,z \in \mathbb{R} \land 0 < i\,z < 1)$$

01.28.27.0034.01

$$\coth^{-1}\left(\sqrt{z^2+1}\right) = \frac{\sqrt{z^2}}{z}\operatorname{csch}^{-1}(z) \;/;\; \operatorname{Re}(z) \neq 0$$

01.28.27.3097.01

$$\coth^{-1}\left(\sqrt{1+z^2}\right) = -\frac{1}{2}\pi\left(\frac{\sqrt{-i\,z-1}}{\sqrt{i\,z+1}} + \frac{\sqrt{i\,z-1}}{\sqrt{1-i\,z}}\right) - \frac{\sqrt{-z^2}\,\sqrt{-z^2-1}}{z\sqrt{z^2+1}}\operatorname{csch}^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right)$ and $\operatorname{csch}^{-1}(z)$

01.28.27.3098.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = \operatorname{csch}^{-1}(z) + \frac{\pi\,i}{2} \;/;\; 0 < \arg(z) < \frac{\pi}{2} \bigvee (i\,z \in \mathbb{R} \land i\,z < -1)$$

01.28.27.3099.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = \operatorname{csch}^{-1}(z) - \frac{\pi\,i}{2} \;/;\; -\frac{\pi}{2} < \arg(z) \leq 0 \bigvee (i\,z \in \mathbb{R} \land 0 < i\,z < 1)$$

01.28.27.3100.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = -\operatorname{csch}^{-1}(z) - \frac{\pi i}{2} /; \frac{\pi}{2} < \arg(z) \leq \pi \bigvee (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.3101.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = -\operatorname{csch}^{-1}(z) + \frac{\pi i}{2} /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.3102.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1+z^2}}\right) = \frac{z\sqrt{-z^2-1}}{\sqrt{-z^4-z^2}} \operatorname{csch}^{-1}(z) + \frac{\pi\sqrt{z^2+1}}{2\sqrt{-z^2-1}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right)$ and $\operatorname{csch}^{-1}(z)$

01.28.27.3103.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = \operatorname{csch}^{-1}(z) + \frac{\pi i}{2} /; 0 < \arg(z) < \frac{\pi}{2}$$

01.28.27.3104.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = \operatorname{csch}^{-1}(z) - \frac{\pi i}{2} /; -\frac{\pi}{2} \leq \arg(z) \leq 0$$

01.28.27.3105.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = -\operatorname{csch}^{-1}(z) - \frac{\pi i}{2} /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.3106.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = -\operatorname{csch}^{-1}(z) + \frac{\pi i}{2} /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.3107.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1+z^2}}\right) = z\sqrt{\frac{1}{z^2}} \operatorname{csch}^{-1}(z) - \frac{\pi\sqrt{-z^2}}{2}\sqrt{\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right)$ and $\operatorname{csch}^{-1}(z)$

01.28.27.3108.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}(z) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee -\frac{\pi}{2} < \arg(z) \leq 0 \bigvee (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.3109.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}(z) /; 0 < \arg(z) < \frac{\pi}{2} \bigvee \frac{\pi}{2} < \arg(z) \leq \pi \bigvee (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.3110.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi i}{2} - \operatorname{csch}^{-1}(z) /; (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.3111.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = -\frac{\pi i}{2} - \operatorname{csch}^{-1}(z) /; (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.3112.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\sqrt{z^2}\sqrt{-z^2-1}}{\sqrt{-z^2\left(z^2+1\right)}} \operatorname{csch}^{-1}(z) - \frac{\pi\sqrt{-z^2-1}}{2z}\sqrt{\frac{z^2}{z^2+1}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3113.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; 0 \leq \arg(z) < \pi$$

01.28.27.3114.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.3115.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2+1}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3116.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.3117.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3118.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3119.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = -\frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3120.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2+1}}\right) = \frac{z}{\sqrt{z^2}} \operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{z^2}}{2}\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3121.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; 0 \leq \arg(z) < \frac{\pi}{2} \bigvee (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.3122.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.3123.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = \frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.3124.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = -\frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0) \bigvee (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.3125.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right) = \frac{\sqrt{z}\sqrt{-z^2-1}}{\sqrt{-z}\sqrt{z^2+1}} \operatorname{csch}^{-1}\left(\frac{1}{z}\right) + \frac{\pi\sqrt{-z^2}\sqrt{-z^2-1}}{2\sqrt{z^2+1}} \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3126.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = -\frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; 0 \leq \arg(z) \leq \frac{\pi}{2}$$

01.28.27.3127.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi i}{2} + \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3128.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3129.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = -\frac{\pi i}{2} - \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3130.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2+1}}\right) = \frac{\sqrt{z^2}}{z} \operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{z^2}}{2} \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3131.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; i z \notin (-\infty, -1) \bigwedge i z \notin (1, \infty)$$

01.28.27.3132.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \pi i /; (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.3133.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) + \pi i /; (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.3134.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; i z \notin (-\infty, -1) \bigwedge i z \notin (1, \infty)$$

01.28.27.3135.01

$$\coth^{-1}\left(\frac{\sqrt{z^2+1}}{z}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{1}{i z+1}}\sqrt{i z+1} - \sqrt{\frac{1}{1-i z}}\sqrt{1-i z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3136.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0 \lor (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.3137.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = -\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) < 0 \lor (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.3138.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \pi\, i \;/;\; (i\, z \in \mathbb{R} \land i\, z < -1)$$

01.28.27.3139.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = -\operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \pi\, i \;/;\; (i\, z \in \mathbb{R} \land i\, z > 1)$$

01.28.27.3140.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}}{\sqrt{z^2}}\right) = \frac{\pi\, i}{2}\left(\sqrt{1+z^2}\,\sqrt{\frac{1}{1+z^2}} - 1\right) + \frac{\sqrt{z^2}}{z}\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3141.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Re}(z) > 0 \lor (i\, z \in \mathbb{R} \land 0 < i\, z < 1)$$

01.28.27.3142.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = -\operatorname{csch}^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Re}(z) < 0 \lor (i\, z \in \mathbb{R} \land -1 < i\, z < 0)$$

01.28.27.3143.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \pi\, i \;/;\; (i\, z \in \mathbb{R} \land i\, z < -1)$$

01.28.27.3144.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = -\operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \pi\, i \;/;\; (i\, z \in \mathbb{R} \land i\, z > 1)$$

01.28.27.3145.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2-1}}{\sqrt{-z^2}}\right) = \frac{\pi\, i}{2}\left(\sqrt{1+z^2}\,\sqrt{\frac{1}{1+z^2}} - 1\right) + \frac{\sqrt{-z^2-z^4}}{z\sqrt{-1-z^2}}\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3146.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) > 0 \lor (i z \in \mathbb{R} \land 0 < i z < 1)$$

01.28.27.3147.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = -\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \operatorname{Re}(z) < 0 \lor (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.3148.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \pi i /; (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.3149.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = -\operatorname{csch}^{-1}\left(\frac{1}{z}\right) - \pi i /; (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.3150.01

$$\coth^{-1}\left(\sqrt{\frac{z^2+1}{z^2}}\right) = \frac{\pi i}{2}\left(\sqrt{1+z^2}\sqrt{\frac{1}{1+z^2}} - 1\right) + \frac{\sqrt{z}\sqrt{-z^2-1}}{\sqrt{-z}\sqrt{z^2+1}} \operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+a}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3151.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3152.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi i}{2} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; 0 \le \arg(z) < \pi$$

01.28.27.3153.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi i}{2} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.3154.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3155.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi i}{2} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; 0 \le \arg(z) < \pi$$

01.28.27.3156.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{\pi i}{2} + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.3157.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi}{2}\sqrt{-\frac{1}{z^2}}\, z + \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3158.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = \frac{1}{2}\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right)$ and $\operatorname{csch}^{-1}(z)$

01.28.27.3159.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = \frac{\pi i}{2} + 2\,\mathrm{csch}^{-1}(z) \;/;\; 0 < \arg(z) < \frac{\pi}{2} \bigvee (i\,z \in \mathbb{R} \land i\,z < -1)$$

01.28.27.3160.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = -\frac{\pi i}{2} + 2\,\mathrm{csch}^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) \le 0$$

01.28.27.3161.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = -\frac{\pi i}{2} - 2\,\mathrm{csch}^{-1}(z) \;/;\; \frac{\pi}{2} < \arg(z) \le \pi$$

01.28.27.3162.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = \frac{\pi i}{2} - 2\,\mathrm{csch}^{-1}(z) \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (i\,z \in \mathbb{R} \land i\,z > 1)$$

01.28.27.3163.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = -\frac{3\pi i}{2} - 2\,\mathrm{csch}^{-1}(z) \;/;\; (i\,z \in \mathbb{R} \land -1 < i\,z < 0)$$

01.28.27.3164.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = -\frac{3\pi i}{2} + 2\,\mathrm{csch}^{-1}(z) \;/;\; (i\,z \in \mathbb{R} \land 0 < i\,z < 1)$$

01.28.27.3165.01

$$\coth^{-1}\left(\frac{2\sqrt{1+z^2}}{2+z^2}\right) = \left(\sqrt{\frac{z^2}{z^2+1}}\sqrt{\frac{z^2+1}{z^2}} + \frac{i\sqrt{-z^2}}{2\sqrt{z^2}} - 1\right)\pi i + \frac{2z}{\sqrt{z^2+1}}\sqrt{1+\frac{1}{z^2}}\,\mathrm{csch}^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right)$

Involving $\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right)$ and $\mathrm{csch}^{-1}(z)$

01.28.27.3166.01

$$\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right) = 2\,\mathrm{csch}^{-1}(z) \;/;\; |z| > \sqrt{2} \bigwedge -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.28.27.3167.01

$$\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right) = -2\,\mathrm{csch}^{-1}(z) \;/;\; |z| > \sqrt{2} \bigwedge \left(\frac{\pi}{2} < \arg(z) \le \pi \bigvee -\pi < \arg(z) \le -\frac{\pi}{2}\right)$$

01.28.27.3168.01

$$\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right) = \frac{\sqrt{z^2+1}}{\sqrt{-z^2-1}}\left(\frac{2\sqrt{-z^2}}{z}\operatorname{csch}^{-1}(z) - \left(\theta\left(\left|\sqrt{-z^2-1}\right|-1\right)-1\right)\pi\right)$$

01.28.27.3169.01

$$\coth^{-1}\left(\frac{2+z^2}{2\sqrt{1+z^2}}\right) = \frac{\pi}{2\sqrt{z^2+1}}\left(-i z\sqrt{1+\frac{1}{z^2}}\left(i\sqrt{-\frac{1}{z^2}}\,z+\sqrt{\frac{1}{z}}\sqrt{z}-\sqrt{\frac{z}{i+z}}\sqrt{\frac{i+z}{z}}-\sqrt{-\frac{1}{z}}\sqrt{-z}+\sqrt{\frac{-i+z}{z}}\sqrt{\frac{z}{-i+z}}\right)-(z^2+2)\sqrt{-\frac{z^2+1}{z^4}}\sqrt{-\frac{z^4}{z^2+1}}\sqrt{-\frac{z^2+1}{(z^2+2)^2}}\right)+\frac{2z}{\sqrt{z^2+1}}\sqrt{1+\frac{1}{z^2}}\operatorname{csch}^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2+1}}{1+2z^2}\right)$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2+1}}{1+2z^2}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3170.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2+1}}{1+2z^2}\right) = -\frac{\pi i}{2}+2\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; 0 \le \arg(z) < \frac{\pi}{2} \bigvee \frac{\pi}{2} < \arg(z) < \pi \bigvee (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.3171.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2+1}}{1+2z^2}\right) = \frac{\pi i}{2}+2\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee -\frac{\pi}{2} < \arg(z) < 0 \bigvee (i z \in \mathbb{R} \land 0 < i z < 1) \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3172.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2+1}}{1+2z^2}\right) = -\frac{3\pi i}{2}+2\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.3173.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2+1}}{1+2z^2}\right) = \frac{3\pi i}{2}+2\operatorname{csch}^{-1}\left(\frac{1}{z}\right) /; (i z \in \mathbb{R} \land i z > 1)$$

01.28.27.3174.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2+1}}{1+2z^2}\right) = \frac{\pi i}{2}\left(i\sqrt{-\frac{1}{z^2}}\,z-\sqrt{1-i z}\sqrt{\frac{1}{1-i z}}+\sqrt{\frac{1}{i z+1}}\sqrt{i z+1}\right)+2\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{1+2z^2}{2z\sqrt{z^2+1}}\right)$

Involving $\coth^{-1}\left(\frac{1+2z^2}{2z\sqrt{z^2+1}}\right)$ and $\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3175.01

$$\coth^{-1}\left(\frac{1+2z^2}{2z\sqrt{z^2+1}}\right) = 2\operatorname{csch}^{-1}\left(\frac{1}{z}\right)\ /;\ -\frac{\pi}{4} \leq \arg(z) \leq \frac{\pi}{4} \bigvee \frac{3\pi}{4} \leq \arg(z) \leq \pi \bigvee -\pi < \arg(z) \leq -\frac{3\pi}{4}$$

01.28.27.3176.01

$$\coth^{-1}\left(\frac{1+2z^2}{2z\sqrt{z^2+1}}\right) = \frac{\pi i}{2}\left(-\frac{i\sqrt{-z^2}}{z} + \sqrt{-\frac{i}{z}}\sqrt{iz}\sqrt{\frac{1}{i\sqrt{2}\,z-1}}\sqrt{i\sqrt{2}\,z-1} - \sqrt{\frac{i}{z}}\sqrt{-iz}\sqrt{-i\sqrt{2}\,z-1}\sqrt{-\frac{1}{\sqrt{2}\,iz+1}} + \frac{iz\sqrt{-z^2-1}}{\sqrt{z^4+z^2}}\right) + 2\operatorname{csch}^{-1}\left(\frac{1}{z}\right)$$

Involving sech^{-1}

Involving $\coth^{-1}(z)$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\frac{i(1-z^2)}{2z}\right)$

01.28.27.3177.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i(1-z^2)}{2z}\right)\ /;\ |z| < 1 \bigwedge 0 \leq \arg(z) < \frac{\pi}{2} \bigvee |z| > 1 \land \operatorname{Re}(z) \geq 0$$

01.28.27.3178.01

$$\coth^{-1}(z) = -\frac{\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i(1-z^2)}{2z}\right)\ /;\ |z| < 1 \bigwedge \frac{\pi}{2} \leq \arg(z) < \pi \bigvee |z| > 1 \land \operatorname{Re}(z) < 0$$

01.28.27.3179.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i(1-z^2)}{2z}\right)\ /;\ |z| < 1 \bigwedge -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3180.01

$$\coth^{-1}(z) = \frac{3\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i(1-z^2)}{2z}\right)\ /;\ |z| < 1 \bigwedge -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3181.01

$$\coth^{-1}(z) = \frac{\pi}{4}\left(-z\sqrt{-\frac{1}{z^2}} + \frac{z-i}{z+i}\left(-i + \sqrt{-\frac{1}{z^2}}\,z\right)\sqrt{\left(\frac{z+i}{z-i}\right)^2}\right) - \frac{1}{2}\,i\sqrt{\frac{z^2}{z^2+1}}\sqrt{iz-1}\sqrt{\frac{iz+1}{z^2}}\operatorname{sech}^{-1}\left(\frac{i(1-z^2)}{2z}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\frac{i(z^2-1)}{2z}\right)$

01.28.27.3182.01

$$\coth^{-1}(z) = \frac{\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i(z^2-1)}{2z}\right) /;\ |z| < 1 \bigwedge -\frac{\pi}{2} \le \arg(z) < 0 \bigvee |z| > 1 \land \operatorname{Re}(z) > 0$$

01.28.27.3183.01

$$\coth^{-1}(z) = \frac{\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i(z^2-1)}{2z}\right) /;\ |z| < 1 \bigwedge -\pi < \arg(z) < -\frac{\pi}{2} \bigvee |z| > 1 \land \operatorname{Re}(z) \le 0 \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3184.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i(z^2-1)}{2z}\right) /;\ |z| < 1 \bigwedge 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.3185.01

$$\coth^{-1}(z) = -\frac{3\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i(z^2-1)}{2z}\right) /;\ |z| < 1 \bigwedge \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3186.01

$$\coth^{-1}(z) = \frac{1}{4}\pi\left(\frac{z-i}{z+i}\left(i + \sqrt{-\frac{1}{z^2}}\ z\right)\sqrt{\left(\frac{z+i}{z-i}\right)^2} - \sqrt{-\frac{1}{z^2}}\ z\right) + \frac{\sqrt{i\,z}\ \sqrt{z}\ \sqrt{-z^2-1}}{2\sqrt{-z}\ \sqrt{z^2+1}}\sqrt{-\frac{i}{z}}\ \operatorname{sech}^{-1}\left(\frac{i(z^2-1)}{2z}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\frac{1-z^2}{1+z^2}\right)$

01.28.27.3187.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z^2}{1+z^2}\right) /;\ 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.3188.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z^2}{1+z^2}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3189.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z^2}{1+z^2}\right) /;\ \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3190.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z^2}{1+z^2}\right) /;\ -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3191.01

$$\coth^{-1}(z) = \frac{\sqrt{z^2}}{2z}\operatorname{sech}^{-1}\left(\frac{1-z^2}{1+z^2}\right) - \frac{1}{2}\pi z\sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\frac{z^2-1}{z^2+1}\right)$

01.28.27.3192.01

$$\coth^{-1}(z) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; -\frac{\pi}{2} \le \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3193.01

$$\coth^{-1}(z) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; \frac{\pi}{2} \le \arg(z) < \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.3194.01

$$\coth^{-1}(z) = -\pi i + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3195.01

$$\coth^{-1}(z) = \pi i - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z^2-1}{z^2+1}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3196.01

$$\coth^{-1}(z) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}\right) + \frac{z}{2}\sqrt{\frac{1}{z^2}}\operatorname{sech}^{-1}\left(\frac{z^2-1}{z^2+1}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{1-z^2}\right)$

01.28.27.3197.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\sqrt{1-z^2}\right) /; 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3198.01

$$\coth^{-1}(z) = \frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\sqrt{1-z^2}\right) /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3199.01

$$\coth^{-1}(z) = -\frac{\pi i}{2} - \operatorname{sech}^{-1}\left(\sqrt{1-z^2}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.3200.01

$$\coth^{-1}(z) = \frac{\pi i}{2} - \operatorname{sech}^{-1}\left(\sqrt{1-z^2}\right) /; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3201.01

$$\coth^{-1}(z) = -\frac{\pi z}{2}\sqrt{-\frac{1}{z^2}}\sqrt{\frac{1}{1-z^2}}\sqrt{1-z^2} + \frac{\sqrt{z^2}}{z}\operatorname{sech}^{-1}\left(\sqrt{1-z^2}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

01.28.27.3202.01

$$\coth^{-1}(z) = \operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; \operatorname{Re}(z) > 0$$

01.28.27.3203.01

$$\coth^{-1}(z) = -\operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; (i\, z \in \mathbb{R} \land i\, z < 0)$$

01.28.27.3204.01

$$\coth^{-1}(z) = -\pi\, i - \operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3205.01

$$\coth^{-1}(z) = \pi\, i - \operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3206.01

$$\coth^{-1}(z) = \frac{\pi}{2}\left(-2\, i\sqrt{z}\sqrt{\frac{1}{z}} + 2\, i + \frac{\sqrt{-z^2}}{z} - \frac{\sqrt{-z^2}}{\sqrt{z^2}}\right) + i\sqrt{-\frac{i}{z}}\sqrt{-i\, z}\operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

01.28.27.3207.01

$$\coth^{-1}(z) = \operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.28.27.3208.01

$$\coth^{-1}(z) = -\operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) /; \frac{\pi}{2} \leq \arg(z) \leq \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.3209.01

$$\coth^{-1}(z) = z\sqrt{\frac{1}{z^2}}\operatorname{sech}^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

01.28.27.3210.01

$$\coth^{-1}(z) = \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3211.01

$$\coth^{-1}(z) = -\operatorname{sech}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.3212.01

$$\coth^{-1}(z) = -\pi i + \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3213.01

$$\coth^{-1}(z) = \pi i - \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3214.01

$$\coth^{-1}(z) = z\sqrt{\frac{1}{z^2}}\operatorname{sech}^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \sqrt{\frac{z+1}{z}}\sqrt{\frac{z}{z+1}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

01.28.27.3215.01

$$\coth^{-1}(z) = \operatorname{sech}^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) /; -\frac{\pi}{2} \le \arg(z) < \frac{\pi}{2}$$

01.28.27.3216.01

$$\coth^{-1}(z) = -\operatorname{sech}^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) /; \frac{\pi}{2} \le \arg(z) \le \pi \bigvee -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.0035.01

$$\coth^{-1}(z) = z\sqrt{\frac{1}{z^2}}\operatorname{sech}^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{2}\left(1-z^2\right)^{1/4} \Big/ \sqrt{\sqrt{1-z^2}+1}\right)$

01.28.27.3217.01

$$\coth^{-1}(z) = 2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3218.01

$$\coth^{-1}(z) = 2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2} /; -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3219.01

$$\coth^{-1}(z) == -2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right)-\frac{\pi\,i}{2}\;/;\;\frac{\pi}{2}<\arg(z)<\pi\bigvee\left(z\in\mathbb{R}\land z<-1\right)$$

01.28.27.3220.01

$$\coth^{-1}(z) == -2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right)+\frac{\pi\,i}{2}\;/;\;-\pi<\arg(z)\leq-\frac{\pi}{2}\bigvee\left(z\in\mathbb{R}\land -1<z<0\right)$$

01.28.27.3221.01

$$\coth^{-1}(z) == \frac{2\sqrt{z^2}}{z}\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}+1}}\right)-\frac{\pi\,z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{2}\,\left(1-z^2\right)^{1/4}\Big/\sqrt{\sqrt{1-z^2}-1}\right)$

01.28.27.3222.01

$$\coth^{-1}(z) == 2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right)+\frac{\pi\,i}{2}\;/;\;0<\arg(z)<\frac{\pi}{2}$$

01.28.27.3223.01

$$\coth^{-1}(z) == 2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right)-\frac{\pi\,i}{2}\;/;\;-\frac{\pi}{2}\leq\arg(z)<0\bigvee\left(z\in\mathbb{R}\land z>1\right)$$

01.28.27.3224.01

$$\coth^{-1}(z) == -2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right)+\frac{\pi\,i}{2}\;/;\;\frac{\pi}{2}\leq\arg(z)<\pi\bigvee\left(z\in\mathbb{R}\land z<-1\right)$$

01.28.27.3225.01

$$\coth^{-1}(z) == -2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,\left(1-z^2\right)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right)-\frac{\pi\,i}{2}\;/;\;-\pi<\arg(z)<-\frac{\pi}{2}$$

01.28.27.3226.01

$$\coth^{-1}(z) = 2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) - \frac{3\pi i}{2} \,/;\, (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3227.01

$$\coth^{-1}(z) = -2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) + \frac{3\pi i}{2} \,/;\, (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3228.01

$$\coth^{-1}(z) = 2\,z\sqrt{\frac{1}{z^2}}\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z^2)^{1/4}}{\sqrt{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\text{sech}^{-1}\left(\sqrt{2\sqrt{1-z^2}\Big/\left(\sqrt{1-z^2}+1\right)}\right)$

01.28.27.3229.01

$$\coth^{-1}(z) = 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) - \frac{\pi i}{2} \,/;\, 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3230.01

$$\coth^{-1}(z) = 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2} \,/;\, -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3231.01

$$\coth^{-1}(z) = -2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) - \frac{\pi i}{2} \,/;\, \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.3232.01

$$\coth^{-1}(z) = -2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) + \frac{\pi i}{2} \,/;\, -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3233.01

$$\coth^{-1}(z) = \frac{2\sqrt{z^2}}{z}\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}+1}}\right) - \frac{\pi z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{2\sqrt{1-z^2}\Big/\left(\sqrt{1-z^2}-1\right)}\right)$

01.28.27.3234.01

$$\coth^{-1}(z) = 2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2} \;/;\; 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3235.01

$$\coth^{-1}(z) = 2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) - \frac{\pi i}{2} \;/;\; -\frac{\pi}{2} \le \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3236.01

$$\coth^{-1}(z) = -2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2} \;/;\; \frac{\pi}{2} \le \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.3237.01

$$\coth^{-1}(z) = -2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) < -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3238.01

$$\coth^{-1}(z) = 2z\sqrt{\frac{1}{z^2}}\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z^2}}{\sqrt{1-z^2}-1}}\right) + \frac{\pi i}{2}\left(-\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} + \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} + \frac{i\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{2}\left(z^2-1\right)^{1/4}\Big/\sqrt{\sqrt{z^2-1}+z}\right)$

01.28.27.3239.01

$$\coth^{-1}(z) = 2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\left(z^2-1\right)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right) \;/;\; \operatorname{Re}(z) > 0$$

01.28.27.3240.01

$$\coth^{-1}(z) = -2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\left(z^2-1\right)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right) \;/;\; (i z \in \mathbb{R} \land i z < 0)$$

01.28.27.3241.01

$$\coth^{-1}(z) = -\pi i - 2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3242.01

$$\coth^{-1}(z) = \pi i - 2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right) /; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3243.01

$$\coth^{-1}(z) = \frac{\pi}{2}\sqrt{\frac{1}{z}}\sqrt{-z}\left(1-\frac{\sqrt{z^2}}{z}\right) + 2 i \sqrt{-\frac{i}{z}}\sqrt{-i z}\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}+z}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{2}\,(z^2-1)^{1/4} \Big/ \sqrt{\sqrt{z^2-1}-z}\right)$

01.28.27.3244.01

$$\coth^{-1}(z) = -\pi i + 2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) /; 0 \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.3245.01

$$\coth^{-1}(z) = \pi i + 2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3246.01

$$\coth^{-1}(z) = -2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) /; \operatorname{Re}(z) < 0$$

01.28.27.3247.01

$$\coth^{-1}(z) = 2\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right) /; (i z \in \mathbb{R} \land i z > 0)$$

01.28.27.3248.01

$$\coth^{-1}(z) = -\frac{\pi}{2}\sqrt{-\frac{1}{z}}\sqrt{z}\left(1+\frac{\sqrt{z^2}}{z}\right) - 2\,i\sqrt{\frac{i}{z}}\sqrt{i\,z}\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(z^2-1)^{1/4}}{\sqrt{\sqrt{z^2-1}-z}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{2\sqrt{z^2-1}\Big/\left(\sqrt{z^2-1}+z\right)}\right)$

01.28.27.3249.01

$$\coth^{-1}(z) = 2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) /; \operatorname{Re}(z) > 0$$

01.28.27.3250.01

$$\coth^{-1}(z) = -2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) /; (i\,z \in \mathbb{R} \land i\,z < 0)$$

01.28.27.3251.01

$$\coth^{-1}(z) = -\pi\,i - 2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.3252.01

$$\coth^{-1}(z) = \pi\,i - 2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right) /; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3253.01

$$\coth^{-1}(z) = \frac{\pi}{2}\sqrt{\frac{1}{z}}\sqrt{-\frac{z}{z+1}}\sqrt{z+1}\left(1-\frac{\sqrt{z^2}}{z}\right) + 2\,i\sqrt{-\frac{i}{z}}\sqrt{-i\,z}\,\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}+z}}\right)$$

Involving $\coth^{-1}(z)$ and $\operatorname{sech}^{-1}\left(\sqrt{2\sqrt{z^2-1}\Big/\left(\sqrt{z^2-1}-z\right)}\right)$

01.28.27.3254.01

$$\coth^{-1}(z) = -\pi\,i + 2\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right) /; 0 < \arg(z) \le \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3255.01

$$\coth^{-1}(z) = \pi i + 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0 \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3256.01

$$\coth^{-1}(z) = -2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right) /;\ \text{Re}(z) < 0$$

01.28.27.3257.01

$$\coth^{-1}(z) = 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right) /;\ (i\,z \in \mathbb{R} \land i\,z > 0)$$

01.28.27.3258.01

$$\coth^{-1}(z) = -\frac{1}{2}\pi\sqrt{\frac{1}{1-z}}\sqrt{-\frac{1}{z}}\sqrt{(1-z)\,z}\left(\frac{\sqrt{z^2}}{z}+1\right) - 2\,i\sqrt{\frac{i}{z}}\sqrt{i\,z}\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{z^2-1}}{\sqrt{z^2-1}-z}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$

Involving $\coth^{-1}(\sqrt{z})$ and $\text{sech}^{-1}\left(\frac{1-z}{1+z}\right)$

01.28.27.3259.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\,\text{sech}^{-1}\left(\frac{1-z}{1+z}\right) - \frac{\pi\,i}{2} /;\ \text{Im}(z) \geq 0$$

01.28.27.3260.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\,\text{sech}^{-1}\left(\frac{1-z}{1+z}\right) + \frac{\pi\,i}{2} /;\ \text{Im}(z) < 0$$

01.28.27.3261.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\,\text{sech}^{-1}\left(\frac{1-z}{1+z}\right) - \frac{1}{2}\sqrt{z}\sqrt{-\frac{1}{z}}\,\pi$$

Involving $\coth^{-1}(\sqrt{z})$ and $\text{sech}^{-1}\left(\frac{z-1}{z+1}\right)$

01.28.27.3262.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\,\text{sech}^{-1}\left(\frac{z-1}{z+1}\right) /;\ z \notin (-\infty, 1)$$

01.28.27.3263.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\,\text{sech}^{-1}\left(\frac{z-1}{z+1}\right) - \pi\,i /;\ (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3264.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{z+1}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3265.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - 1\right) + \frac{\sqrt{z}}{2}\sqrt{\frac{1}{z}}\operatorname{sech}^{-1}\left(\frac{z-1}{z+1}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

01.28.27.3266.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{4} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.3267.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) + \frac{\pi i}{4} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3268.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{3\pi i}{4} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3269.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) - \frac{\pi i}{4} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3270.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + \frac{i z}{2\sqrt{-z^2}} - 1\right)\frac{\pi i}{2} + \frac{1}{2}\sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$

01.28.27.3271.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{3\pi i}{4} /; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.3272.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{3\pi i}{4} /; |z| < 1 \land \operatorname{Im}(z) < 0$$

01.28.27.3273.01

$$\coth^{-1}\left(\sqrt{z}\right) = \left(\sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}} - \frac{3 i\sqrt{-z^2}}{2z} - 1\right)\frac{\pi i}{2} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| < 1$$

01.28.27.3274.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{\pi i}{4} /; |z| > 1 \land \operatorname{Im}(z) > 0$$

01.28.27.3275.01

$$\coth^{-1}(\sqrt{z}) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi i}{4} \;/;\; |z| > 1 \land \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 0)$$

01.28.27.3276.01

$$\coth^{-1}(\sqrt{z}) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{\pi i}{4} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3277.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi z}{4\sqrt{-z^2}} + \frac{1}{2}\sqrt{\frac{1}{z+1}}\sqrt{z+1}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) \;/;\; |z| > 1$$

01.28.27.3278.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi}{8}\left(2i\left(-1+\sqrt{\frac{-1+z}{z}}\sqrt{\frac{z}{-1+z}} + \frac{3iz}{2\sqrt{-z^2}}\right)\left(1-\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right) + \frac{z}{\sqrt{-z^2}}\left(1+\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right)\right) + \frac{1}{4}\left(1-\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2} + \sqrt{\frac{1}{1+z}}\sqrt{1+z}\left(1+\frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right)\right)\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{sech}^{-1}(\sqrt{1-z})$

01.28.27.3279.01

$$\coth^{-1}(\sqrt{z}) = -\frac{\pi i}{2} + \operatorname{sech}^{-1}(\sqrt{1-z}) \;/;\; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3280.01

$$\coth^{-1}(\sqrt{z}) = \frac{\pi i}{2} + \operatorname{sech}^{-1}(\sqrt{1-z}) \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3281.01

$$\coth^{-1}(\sqrt{z}) = \operatorname{sech}^{-1}(\sqrt{1-z}) - \frac{1}{2}\pi\sqrt{\frac{1}{1-z}}\sqrt{-\frac{1}{z}}\sqrt{(1-z)z}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

01.28.27.3282.01

$$\coth^{-1}(\sqrt{z}) = \operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) \;/;\; |\arg(z)| < \pi$$

01.28.27.3283.01

$$\coth^{-1}(\sqrt{z}) = -\operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3284.01

$$\coth^{-1}(\sqrt{z}) = \sqrt{z}\sqrt{\frac{1}{z}}\operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

01.28.27.3285.01

$$\coth^{-1}(\sqrt{z}) = \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) /; z \notin (-\infty, 1)$$

01.28.27.3286.01

$$\coth^{-1}(\sqrt{z}) = \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \pi i /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3287.01

$$\coth^{-1}(\sqrt{z}) = -\operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3288.01

$$\coth^{-1}(\sqrt{z}) = \sqrt{z} \sqrt{\frac{1}{z}} \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) + \frac{\pi i}{2}\left(\sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} - 1\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

01.28.27.3289.01

$$\coth^{-1}(\sqrt{z}) = \operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right) /; |\arg(z)| < \pi$$

01.28.27.3290.01

$$\coth^{-1}(\sqrt{z}) = -\operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right) /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3291.01

$$\coth^{-1}(\sqrt{z}) = \sqrt{z} \sqrt{\frac{1}{z}} \operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\operatorname{sech}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \big/ \sqrt{\sqrt{1-z}+1}\right)$

01.28.27.3292.01

$$\coth^{-1}(\sqrt{z}) = 2 \operatorname{sech}^{-1}\left(\frac{\sqrt{2}\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}+1}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3293.01

$$\coth^{-1}(\sqrt{z}) = 2 \operatorname{sech}^{-1}\left(\frac{\sqrt{2}\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}+1}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3294.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}+1}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\text{sech}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \big/ \sqrt{\sqrt{1-z}-1}\right)$

01.28.27.3295.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-1}}\right) + \frac{\pi i}{2} \;/;\; \text{Im}(z) > 0$$

01.28.27.3296.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-1}}\right) - \frac{\pi i}{2} \;/;\; \text{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3297.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-1}}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3298.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-1}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3299.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-1}}\right) - \frac{1}{2}\pi\left(\frac{\sqrt{z-1}}{\sqrt{1-z}} + \frac{2\sqrt{-z^2}}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\text{sech}^{-1}\left(\sqrt{2\sqrt{1-z}\big/\left(\sqrt{1-z}+1\right)}\right)$

01.28.27.3300.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{\pi i}{2} \;/;\; 0 < \arg(z) \le \pi \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3301.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) + \frac{\pi i}{2} \;/;\; \text{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3302.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right) - \frac{\pi\sqrt{z-1}}{2\sqrt{1-z}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\text{sech}^{-1}\left(\sqrt{2\sqrt{1-z}/(\sqrt{1-z}-1)}\right)$

01.28.27.3303.01

$$\coth^{-1}(\sqrt{z}) = 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) + \frac{\pi i}{2} \;/;\; \text{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3304.01

$$\coth^{-1}(\sqrt{z}) = 2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) - \frac{\pi i}{2} \;/;\; \text{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3305.01

$$\coth^{-1}(\sqrt{z}) = -2\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3306.01

$$\coth^{-1}(\sqrt{z}) = 2\sqrt{z}\sqrt{\frac{1}{z}}\,\text{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) - \frac{\pi\sqrt{1-z}}{2\sqrt{z-1}}$$

Involving $\coth^{-1}(\sqrt{z})$ and $\text{sech}^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}+\sqrt{-z}}\right)$

01.28.27.3307.01

$$\coth^{-1}(\sqrt{z}) = 2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) \;/;\; z \notin (-\infty, 1)$$

01.28.27.3308.01

$$\coth^{-1}(\sqrt{z}) = 2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \pi i \;/;\; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3309.01

$$\coth^{-1}(\sqrt{z}) = -2\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3310.01

$$\coth^{-1}(\sqrt{z}) = 2\sqrt{z}\sqrt{\frac{1}{z}}\,\text{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi i}{2}\left(1 - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\right)$$

Involving $\coth^{-1}(\sqrt{z})$ and $\text{sech}^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\left(\sqrt{\sqrt{1-z}-\sqrt{-z}}\right)\right)$

01.28.27.3311.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) - \pi\,i\;/;\;0 < \arg(z) \leq \pi$$

01.28.27.3312.01

$$\coth^{-1}\left(\sqrt{z}\right) = \pi\,i + 2\,\mathrm{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)\;/;\;\mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3313.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)\;/;\;(z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3314.01

$$\coth^{-1}\left(\sqrt{z}\right) = \frac{\pi\,i}{2}\left(\sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}} - \frac{2\,i\sqrt{-z^2}}{z} - 1\right) + 2\,\mathrm{sech}^{-1}\left(\frac{\sqrt{2}\,\sqrt[4]{1-z}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\mathrm{sech}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}+\sqrt{-z}\right)}\right)$

01.28.27.3315.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)\;/;\;z \notin (-\infty, 1)$$

01.28.27.3316.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \pi\,i\;/;\;(z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3317.01

$$\coth^{-1}\left(\sqrt{z}\right) = -2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)\;/;\;(z \in \mathbb{R} \land z < 0)$$

01.28.27.3318.01

$$\coth^{-1}\left(\sqrt{z}\right) = -\frac{\pi\,i}{2}\left(1 - \sqrt{\frac{z-1}{z}}\,\sqrt{\frac{z}{z-1}}\right) + 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\sqrt{z}\right)$ and $\mathrm{sech}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}-\sqrt{-z}\right)}\right)$

01.28.27.3319.01

$$\coth^{-1}\left(\sqrt{z}\right) = 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) - \pi\,i\;/;\;0 < \arg(z) \leq \pi$$

01.28.27.3320.01

$$\coth^{-1}\left(\sqrt{z}\right) \equiv \pi i + 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) /; \mathrm{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3321.01

$$\coth^{-1}\left(\sqrt{z}\right) \equiv 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3322.01

$$\coth^{-1}\left(\sqrt{z}\right) \equiv \frac{\pi i}{2}\left(\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} - \frac{2 i \sqrt{-z^2}}{z} - 1\right) + 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\mathrm{sech}^{-1}\left(\frac{1-z}{1+z}\right)$

01.28.27.3323.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \equiv \frac{1}{2}\,\mathrm{sech}^{-1}\left(\frac{1-z}{1+z}\right) /; z \notin (1, \infty)$$

01.28.27.3324.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \equiv \frac{1}{2}\,\mathrm{sech}^{-1}\left(\frac{1-z}{1+z}\right) - \pi i /; (z \in \mathbb{R} \land z > 1)$$

01.28.27.3325.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \equiv \frac{1}{2}\,\mathrm{sech}^{-1}\left(\frac{1-z}{1+z}\right) + \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\mathrm{sech}^{-1}\left(\frac{z-1}{z+1}\right)$

01.28.27.3326.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \equiv \frac{1}{2}\,\mathrm{sech}^{-1}\left(\frac{z-1}{z+1}\right) + \frac{\pi i}{2} /; \mathrm{Im}(z) > 0$$

01.28.27.3327.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \equiv \frac{1}{2}\,\mathrm{sech}^{-1}\left(\frac{z-1}{z+1}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \le 0$$

01.28.27.3328.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) \equiv -\frac{1}{2}\,\mathrm{sech}^{-1}\left(\frac{z-1}{z+1}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3329.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\sqrt{z}\sqrt{\frac{1}{z}}\operatorname{sech}^{-1}\left(\frac{z-1}{z+1}\right) - \frac{\pi\sqrt{-z^2}}{2z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$

01.28.27.3330.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1)$$

01.28.27.3331.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; -\pi < \arg(z) \leq 0$$

01.28.27.3332.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3333.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi z}{4\sqrt{-z^2}} + \frac{1}{2}\sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\operatorname{sech}^{-1}\left(\frac{1-z}{2\sqrt{-z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right)$

01.28.27.3334.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{\pi i}{4} /; |z| < 1 \bigwedge 0 < \arg(z) \leq \pi$$

01.28.27.3335.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) /; |z| < 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.3336.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{\pi\sqrt{-z^2}}{4z} /; |z| < 1$$

01.28.27.3337.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{3\pi i}{4} /; |z| > 1 \land \operatorname{Im}(z) > 0$$

01.28.27.3338.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{3\pi i}{4} /; |z| > 1 \bigwedge -\pi < \arg(z) \leq 0$$

01.28.27.3339.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) + \frac{3\pi i}{4} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3340.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{1}{2}\sqrt{z+1}\sqrt{\frac{1}{z+1}}\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) - \frac{3\pi\sqrt{-z^2}}{4z} \;/;\; |z| > 1$$

01.28.27.3341.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi z}{4\sqrt{-z^2}}\left(1 + \frac{2(z+1)}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right) + \frac{1}{4}\left(1 - \frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2} + \sqrt{\frac{1}{1+z}}\sqrt{1+z}\left(1 + \frac{z+1}{z-1}\sqrt{\left(\frac{z-1}{z+1}\right)^2}\right)\right)\operatorname{sech}^{-1}\left(\frac{z-1}{2\sqrt{-z}}\right) \;/;\; |z| \neq 1$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{1-z}\right)$

01.28.27.3342.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{1-z}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

01.28.27.3343.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) \;/;\; \operatorname{Im}(z) > 0 \land (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3344.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) - \frac{\pi i}{2} \;/;\; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3345.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3346.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\sqrt{z-1}}{2\sqrt{-z}}\sqrt{\frac{z}{z-1}} + \sqrt{\frac{1}{z}}\sqrt{z}\operatorname{sech}^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

01.28.27.3347.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) \;/;\; \operatorname{Im}(z) > 0$$

01.28.27.3348.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq 0$$

01.28.27.3349.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3350.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \operatorname{sech}^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) - \frac{\pi \sqrt{-z^2}}{2 z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

01.28.27.3351.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right) /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3352.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right) - \frac{\pi i}{2} /; -\pi < \arg(z) < 0 \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3353.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -\operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3354.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \sqrt{z} \sqrt{\frac{1}{z}} \operatorname{sech}^{-1}\left(\sqrt{\frac{z-1}{z}}\right) - \frac{\pi \sqrt{1-z}}{2 \sqrt{z-1}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{2} (1-z)^{1/4} \Big/ \sqrt{\sqrt{1-z} + 1}\right)$

01.28.27.3355.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2 \operatorname{sech}^{-1}\left(\frac{\sqrt{2} (1-z)^{1/4}}{\sqrt{\sqrt{1-z} + 1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{2} (1-z)^{1/4} \Big/ \sqrt{\sqrt{1-z} - 1}\right)$

01.28.27.3356.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \pi i + 2 \operatorname{sech}^{-1}\left(\frac{\sqrt{2} (1-z)^{1/4}}{\sqrt{\sqrt{1-z} - 1}}\right) /; \operatorname{Im}(z) > 0$$

01.28.27.3357.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\mathrm{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) - \pi\,i\;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.3358.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,\mathrm{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) + \pi\,i\;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3359.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\mathrm{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-1}}\right) - \frac{\pi\sqrt{-z^2}}{z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\mathrm{sech}^{-1}\left(\sqrt{2\sqrt{1-z}/(\sqrt{1-z}+1)}\right)$

01.28.27.3360.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\mathrm{sech}^{-1}\left(\sqrt{2\sqrt{1-z}/(\sqrt{1-z}-1)}\right)$

01.28.27.3361.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \pi\,i + 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right)\;/;\; \mathrm{Im}(z) > 0 \lor (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3362.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) - \pi\,i\;/;\; \mathrm{Im}(z) < 0\, z > 1$$

01.28.27.3363.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) + \pi\,i\;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3364.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\mathrm{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-1}}\right) - \frac{\pi\sqrt{1-z}}{\sqrt{z-1}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\mathrm{sech}^{-1}\left(\sqrt{2}\,(1-z)^{1/4}\Big/\sqrt{\sqrt{1-z}+\sqrt{-z}}\right)$

01.28.27.3365.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi\,i}{2} /;\ \operatorname{Im}(z) > 0$$

01.28.27.3366.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi\,i}{2} /;\ -\pi < \arg(z) \leq 0$$

01.28.27.3367.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi\,i}{2} /;\ (z \in \mathbb{R} \land z < 0)$$

01.28.27.3368.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\,z}{2\sqrt{-z^2}} + 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{2}\,(1-z)^{1/4} \Big/ \sqrt{\sqrt{1-z}-\sqrt{-z}}\right)$

01.28.27.3369.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi\,i}{2} /;\ 0 < \arg(z) \leq \pi$$

01.28.27.3370.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\,i}{2} /;\ -\pi < \arg(z) \leq 0$$

01.28.27.3371.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\frac{\sqrt{2}\,(1-z)^{1/4}}{\sqrt{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{2\sqrt{1-z}\,\big/\left(\sqrt{1-z}+\sqrt{-z}\right)}\right)$

01.28.27.3372.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi\,i}{2} /;\ \operatorname{Im}(z) > 0$$

01.28.27.3373.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) - \frac{\pi\,i}{2} /;\ -\pi < \arg(z) \leq 0$$

01.28.27.3374.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = -2\,\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right) + \frac{\pi\, i}{2} \;/;\; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3375.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = \frac{\pi\, z}{2\sqrt{-z^2}} + 2\sqrt{z}\,\sqrt{\frac{1}{z}}\,\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}+\sqrt{-z}}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{2\sqrt{1-z}\,/\left(\sqrt{1-z}-\sqrt{-z}\right)}\right)$

01.28.27.3376.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) - \frac{\pi\, i}{2} \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.3377.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\, i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.3378.01

$$\coth^{-1}\left(\frac{1}{\sqrt{z}}\right) = 2\,\operatorname{sech}^{-1}\left(\sqrt{\frac{2\sqrt{1-z}}{\sqrt{1-z}-\sqrt{-z}}}\right) + \frac{\pi\sqrt{-z^2}}{2\,z}$$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{z}\right)$

01.28.27.3379.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \frac{\pi\, i}{2} + \operatorname{sech}^{-1}\left(\sqrt{z}\right) \;/;\; 0 < \arg(z) \leq \pi$$

01.28.27.3380.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \operatorname{sech}^{-1}\left(\sqrt{z}\right) - \frac{\pi\, i}{2} \;/;\; -\pi < \arg(z) \leq 0$$

01.28.27.3381.01

$$\coth^{-1}\left(\sqrt{1-z}\right) = \operatorname{sech}^{-1}\left(\sqrt{z}\right) - \frac{\pi\sqrt{-z}}{2\sqrt{z}}$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{z}\right)$

01.28.27.0036.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{z}\right)$

01.28.27.3382.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{z}\right) /; z \notin (1, \infty)$$

01.28.27.3383.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = -\operatorname{sech}^{-1}\left(\sqrt{z}\right) /; (z \in \mathbb{R} \wedge z > 1)$$

01.28.27.3384.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z}}\right) = \sqrt{1-z} \sqrt{\frac{1}{1-z}} \operatorname{sech}^{-1}\left(\sqrt{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3385.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) \geq 0$$

01.28.27.3386.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.3387.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{1}{2} \pi \sqrt{z} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3388.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; 0 \leq \arg(z) < \pi$$

01.28.27.3389.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.3390.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi}{2} z \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3391.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) \leq \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3392.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.3393.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3394.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi \sqrt{1-z} \sqrt{-z}}{2 \sqrt{z}} \sqrt{\frac{1}{1-z}} + \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3395.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; 0 < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3396.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.3397.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = -\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3398.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-z}}\right) = \frac{\pi \sqrt{-z}}{2} \sqrt{\frac{1-z}{z}} \sqrt{\frac{1}{1-z}} + \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3399.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) \geq 0$$

01.28.27.3400.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.3401.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \frac{\pi \sqrt{z}}{2} \sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3402.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi i}{2} /; 0 \leq \arg(z) < \pi$$

01.28.27.3403.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0 \lor (z \in \mathbb{R} \land z < 0)$$

01.28.27.3404.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) - \frac{\pi z}{2} \sqrt{-\frac{1}{z^2}}$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3405.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; |\arg(z)| < \pi$$

01.28.27.3406.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3407.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) + \frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3408.01

$$\coth^{-1}\left(\frac{\sqrt{z}}{\sqrt{z-1}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3409.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; z \notin (-\infty, 1)$$

01.28.27.3410.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3411.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3412.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == \left(\sqrt{z}\sqrt{\frac{1}{z}}-1\right)\frac{\pi i}{2}+\sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3413.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; z \notin (0, 1)$$

01.28.27.3414.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == -\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3415.01

$$\coth^{-1}\left(\frac{\sqrt{-z}}{\sqrt{1-z}}\right) == \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)$

01.28.27.3416.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; z \notin (-\infty, 1)$$

01.28.27.3417.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == -\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3418.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == \operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right) - \pi i /; (z \in \mathbb{R} \land z < 0)$$

01.28.27.3419.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) == \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\operatorname{sech}^{-1}\left(\frac{1}{\sqrt{z}}\right)+\frac{\pi i}{2}\left(\sqrt{z}\sqrt{\frac{1}{z}}-1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right)$ and $\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$

01.28.27.3420.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; z \notin (0, 1)$$

01.28.27.3421.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = -\operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3422.01

$$\coth^{-1}\left(\sqrt{\frac{z}{z-1}}\right) = \sqrt{\frac{z}{z-1}} \sqrt{\frac{z-1}{z}} \operatorname{sech}^{-1}\left(\sqrt{\frac{1}{z}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-a}}{\sqrt{z+a}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3423.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; z \notin (-\infty, -1)$$

01.28.27.3424.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3425.01

$$\coth^{-1}\left(\frac{\sqrt{z+1}}{\sqrt{z-1}}\right) = \frac{1}{2} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2}\left(\sqrt{z+1} \sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3426.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) \geq 0$$

01.28.27.3427.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.3428.01

$$\coth^{-1}\left(\frac{\sqrt{z-1}}{\sqrt{z+1}}\right) = \frac{1}{2} \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{1}{2} \sqrt{z} \sqrt{-\frac{1}{z}} \pi$$

Involving $\coth^{-1}\left(\frac{\sqrt{a-z}}{\sqrt{-a-z}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3429.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; z \notin (-\infty, 1)$$

01.28.27.3430.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.3431.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3432.01

$$\coth^{-1}\left(\frac{\sqrt{-1-z}}{\sqrt{1-z}}\right) = \frac{1}{2}\sqrt{\frac{z^2-1}{z^2}}\sqrt{\frac{z^2}{z^2-1}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2}\left(1 - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3433.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z < -1) \lor (z \in \mathbb{R} \land z > 1)$$

01.28.27.3434.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.3435.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.3436.01

$$\coth^{-1}\left(\frac{\sqrt{1-z}}{\sqrt{-1-z}}\right) = \frac{1}{2}\sqrt{\frac{z^2-1}{z^2}}\sqrt{\frac{z^2}{z^2-1}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{-z}\, z\sqrt{z^2-1}}{2\sqrt{z^2-z^4}}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-a}{z+a}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3437.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; z \notin (-\infty, 1)$$

01.28.27.3438.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land -1 < z < 1)$$

01.28.27.3439.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3440.01

$$\coth^{-1}\left(\sqrt{\frac{z+1}{z-1}}\right) = \frac{1}{2}\sqrt{\frac{z-1}{z+1}}\sqrt{\frac{z+1}{z-1}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2}\left(\sqrt{z+1}\sqrt{\frac{1}{z+1}} - 1\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3441.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) \geq 0$$

01.28.27.3442.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; \operatorname{Im}(z) < 0$$

01.28.27.3443.01

$$\coth^{-1}\left(\sqrt{\frac{z-1}{z+1}}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{z}}{2}\sqrt{-\frac{1}{z}}$$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$

Involving $\coth^{-1}\left(\sqrt{1-z^2}\right)$ and $\operatorname{sech}^{-1}(z)$

01.28.27.3444.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \frac{\pi i}{2} + \operatorname{sech}^{-1}(z) /; \operatorname{Im}(z) > 0$$

01.28.27.3445.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \operatorname{sech}^{-1}(z) - \frac{\pi i}{2} /; -\pi < \arg(z) \leq 0$$

01.28.27.3446.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \operatorname{sech}^{-1}(z) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3447.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = -\operatorname{sech}^{-1}(z) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3448.01

$$\coth^{-1}\left(\sqrt{1-z^2}\right) = \sqrt{z+1}\sqrt{\frac{1}{z+1}}\operatorname{sech}^{-1}(z) - \frac{\pi}{2}\left(\frac{\sqrt{z-1}}{\sqrt{1-z}} - \frac{\sqrt{z^2}\sqrt{-1+z^2}}{z\sqrt{1-z^2}} + \frac{\sqrt{-z-1}}{\sqrt{z+1}}\right)$$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right)$ and $\operatorname{sech}^{-1}(z)$

01.28.27.0037.02

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \operatorname{sech}^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \leq \frac{\pi}{2}$$

01.28.27.3449.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \operatorname{sech}^{-1}(z) + \pi i /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3450.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \operatorname{sech}^{-1}(z) - \pi i /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3451.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = -\operatorname{sech}^{-1}(z) + \pi i /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3452.01

$$\coth^{-1}\left(\frac{1}{\sqrt{1-z^2}}\right) = \left(\frac{\sqrt{1-z^2}}{\sqrt{z^2-1}} + \frac{z\sqrt{z^2-1}}{\sqrt{z^2-z^4}}\right)\frac{\pi}{2} + \sqrt{z+1}\sqrt{\frac{1}{z+1}}\operatorname{sech}^{-1}(z)$$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right)$ and $\operatorname{sech}^{-1}(z)$

01.28.27.3453.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \operatorname{sech}^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3454.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \operatorname{sech}^{-1}(z) + \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3455.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \operatorname{sech}^{-1}(z) - \pi i \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3456.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = -\operatorname{sech}^{-1}(z) \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.3457.01

$$\coth^{-1}\left(\sqrt{\frac{1}{1-z^2}}\right) = \left(\frac{\sqrt{z^2}}{z} - 1\right) \frac{\pi\sqrt{-z}}{2} \sqrt{\frac{1}{z}} + \sqrt{\frac{1}{1-z}} \sqrt{1-z} \operatorname{sech}^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right)$ and $\operatorname{sech}^{-1}(z)$

01.28.27.3458.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \operatorname{sech}^{-1}(z) \;/;\; -\frac{\pi}{2} < \arg(z) < 0 \bigvee 0 < \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3459.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\operatorname{sech}^{-1}(z) - \pi i \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3460.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\operatorname{sech}^{-1}(z) + \pi i \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3461.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = -\operatorname{sech}^{-1}(z) \;/;\; (z \in \mathbb{R} \land z > 1)$$

01.28.27.3462.01

$$\coth^{-1}\left(\frac{1}{z}\sqrt{\frac{z^2}{1-z^2}}\right) = \frac{\sqrt{z^2}\,\sqrt{1-z}}{z}\sqrt{\frac{1}{1-z}}\,\operatorname{sech}^{-1}(z) - \left(\frac{\sqrt{z^2}}{z} - 1\right)\frac{\pi\sqrt{-z}}{2}\sqrt{\frac{1}{z}}$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3463.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Re}(z) > 0$$

01.28.27.3464.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \pi\, i \;/;\; \frac{\pi}{2} < \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.3465.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \pi\, i \;/;\; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.3466.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \pi\, i \;/;\; (i\, z \in \mathbb{R} \land i\, z < 0) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3467.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) \;/;\; (i\, z \in \mathbb{R} \land i\, z > 0)$$

01.28.27.3468.01

$$\coth^{-1}\left(\frac{z}{\sqrt{z^2-1}}\right) = \frac{\pi\sqrt{z^2-1}}{2\sqrt{1-z^2}}\left(z\sqrt{\frac{1}{z^2}} - 1\right) + \frac{\sqrt{-z-1}\,\sqrt{z^2}}{\sqrt{-z^2}\,\sqrt{z+1}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3469.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < \frac{\pi}{2}$$

01.28.27.3470.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \pi i /; \frac{\pi}{2} \leq \arg(z) < \pi \bigvee (z \in \mathbb{R} \land z < -1)$$

01.28.27.3471.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \pi i /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.3472.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \pi i - \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3473.01

$$\coth^{-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) = \frac{\pi \sqrt{z^2-1}}{2\sqrt{1-z^2}} \left(\sqrt{z^2}\sqrt{\frac{1}{z^2}} - \frac{\sqrt{z^2}}{z}\right) + \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3474.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3475.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \pi i /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.3476.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \pi i /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.3477.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3478.01

$$\coth^{-1}\left(\frac{\sqrt{-z^2}}{\sqrt{1-z^2}}\right) = \frac{\pi}{2}\left(\frac{\sqrt{-z}}{\sqrt{z}} - \sqrt{-z^2}\sqrt{\frac{1}{z^2}}\right) + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3479.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} \leq \arg(z) < 0 \bigvee 0 < \arg(z) < \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z > 1)$$

01.28.27.3480.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \pi i /; \frac{\pi}{2} \leq \arg(z) \leq \pi$$

01.28.27.3481.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \pi i /; -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.3482.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3483.01

$$\coth^{-1}\left(\sqrt{\frac{z^2}{z^2-1}}\right) = \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi\sqrt{-z^2}}{2z}\left(z\sqrt{\frac{1}{z^2}} - 1\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3484.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; 0 \leq \arg(z) \leq \frac{\pi}{2} \bigvee (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3485.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\frac{1}{z}\right) \;/;\; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3486.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} \;/;\; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3487.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.3488.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3489.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right) = \frac{\pi i}{2}\left(\sqrt{1-z}\sqrt{\frac{1}{1-z}} - \frac{i\sqrt{1-z^2}}{\sqrt{z^2-1}} - \sqrt{z+1}\sqrt{\frac{1}{z+1}}\right) + \frac{\sqrt{-1-z}\sqrt{z^2}}{\sqrt{-z^2}\sqrt{1+z}} \operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3490.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; 0 \leq \arg(z) < \pi$$

01.28.27.3491.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.3492.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3493.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3494.01

$$\coth^{-1}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - \frac{i\sqrt{z^2-z^4}}{z\sqrt{-1+z^2}} - 1\right)\frac{\pi i}{2} + \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3495.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} /; \operatorname{Im}(z) > 0 \lor (z \in \mathbb{R} \land z > 1) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3496.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\frac{1}{z}\right) /; \operatorname{Im}(z) < 0$$

01.28.27.3497.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{2} /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3498.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} /; (z \in \mathbb{R} \land 0 < z < 1)$$

01.28.27.3499.01

$$\coth^{-1}\left(\frac{\sqrt{1-z^2}}{\sqrt{-z^2}}\right) = \left(\sqrt{1-z^2}\sqrt{\frac{1}{1-z^2}} - \frac{i\sqrt{-z^2}}{z} - 1\right)\frac{\pi i}{2} + \sqrt{\frac{z}{z-1}}\sqrt{\frac{z-1}{z}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$

Involving $\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3500.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{\pi i}{2} \;/;\; 0 \le \arg(z) < \pi$$

01.28.27.3501.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \frac{\pi i}{2} + \operatorname{sech}^{-1}\left(\frac{1}{z}\right) \;/;\; \operatorname{Im}(z) < 0$$

01.28.27.3502.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \operatorname{sech}^{-1}\left(\frac{1}{z}\right) - \frac{3\pi i}{2} \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3503.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = -\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi i}{2} \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3504.01

$$\coth^{-1}\left(\sqrt{\frac{z^2-1}{z^2}}\right) = \sqrt{\frac{z}{z+1}}\sqrt{\frac{z+1}{z}}\operatorname{sech}^{-1}\left(\frac{1}{z}\right) + \left(\sqrt{\frac{1}{z+1}}\sqrt{z+1} + \frac{iz}{2}\sqrt{-\frac{1}{z^2}} - 1\right)\pi i$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right)$ and $\operatorname{sech}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3505.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Re}(z) > 0 \lor (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.3506.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} \;/;\; \operatorname{Re}(z) < 0 \lor (i z \in \mathbb{R} \land i z > 0) \lor (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.3507.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}+1}{z}\right) = \frac{i\sqrt{-i z - 1}}{2\sqrt{i z + 1}}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4}$$

Involving $\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right)$ and $\operatorname{sech}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3508.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) /; 0 \leq \arg(z) < \frac{\pi}{2} \bigvee (i z \in \mathbb{R} \wedge i z < -1)$$

01.28.27.3509.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{3\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3510.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = -\frac{\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (i z \in \mathbb{R} \wedge -1 < i z < 0)$$

01.28.27.3511.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{3\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) /; -\pi < \arg(z) \leq -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \wedge z < 0)$$

01.28.27.3512.01

$$\coth^{-1}\left(\frac{\sqrt{1+z^2}-1}{z}\right) = \frac{\pi}{2}\left(\frac{i}{2} - \sqrt{-\frac{1}{z^2}}\, z\right) + \frac{i\sqrt{-i z - 1}}{2\sqrt{i z + 1}}\operatorname{sech}^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+a}\right)$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right)$ and $\operatorname{sech}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3513.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) /; 0 \leq \arg(z) < \frac{\pi}{2} \bigvee (i z \in \mathbb{R} \wedge i z < -1)$$

01.28.27.3514.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{3\pi i}{4} + \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) /; -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3515.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = -\frac{\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) /; \frac{\pi}{2} < \arg(z) < \pi \bigvee (i z \in \mathbb{R} \wedge -1 < i z < 0)$$

01.28.27.3516.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{3\pi i}{4} - \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) /; -\pi < \arg(z) \le -\frac{\pi}{2} \bigvee (z \in \mathbb{R} \land z < 0)$$

01.28.27.3517.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}+1}\right) = \frac{\pi}{2}\left(\frac{i}{2} - \sqrt{-\frac{1}{z^2}}\, z\right) + \frac{i\sqrt{-i z - 1}}{2\sqrt{i z + 1}}\operatorname{sech}^{-1}\left(\frac{i}{z}\right)$$

Involving $\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right)$ and $\operatorname{sech}^{-1}\left(\frac{i}{z}\right)$

01.28.27.3518.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = \frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} /; \operatorname{Re}(z) > 0 \lor (i z \in \mathbb{R} \land i z < -1)$$

01.28.27.3519.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = -\frac{1}{2}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4} /; \operatorname{Re}(z) < 0 \lor (i z \in \mathbb{R} \land i z > 0) \lor (i z \in \mathbb{R} \land -1 < i z < 0)$$

01.28.27.3520.01

$$\coth^{-1}\left(\frac{z}{\sqrt{1+z^2}-1}\right) = \frac{i\sqrt{-i z - 1}}{2\sqrt{i z + 1}}\operatorname{sech}^{-1}\left(\frac{i}{z}\right) + \frac{\pi i}{4}$$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right)$

Involving $\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right)$ and $\operatorname{sech}^{-1}(z)$

01.28.27.3521.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{\pi i}{2} - 2\operatorname{sech}^{-1}(z) /; 0 < \arg(z) \le \frac{\pi}{2}$$

01.28.27.3522.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{\pi i}{2} - 2\operatorname{sech}^{-1}(z) /; -\frac{\pi}{2} < \arg(z) \le 0$$

01.28.27.3523.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{3\pi i}{2} - 2\operatorname{sech}^{-1}(z) /; \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3524.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{3\pi i}{2} - 2\,\text{sech}^{-1}(z) \;/;\; -\pi < \arg(z) \leq -\frac{\pi}{2}$$

01.28.27.3525.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = \frac{5\pi i}{2} - 2\,\text{sech}^{-1}(z) \;/;\; (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3526.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = -\frac{3\pi i}{2} + 2\,\text{sech}^{-1}(z) \;/;\; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3527.01

$$\coth^{-1}\left(\frac{2\sqrt{1-z^2}}{z^2-2}\right) = i\pi\left(1 - \frac{i\sqrt{z^2}}{2\sqrt{-z^2}} - \sqrt{\frac{z^2}{z^2-1}}\sqrt{\frac{z^2-1}{z^2}} + \frac{iz}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\right) - 2\sqrt{z+1}\sqrt{\frac{1}{z+1}}\,\text{sech}^{-1}(z)$$

Involving $\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right)$

Involving $\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right)$ and $\text{sech}^{-1}(z)$

01.28.27.3528.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = -2\,\text{sech}^{-1}(z) - \pi i \;/;\; |z| > \sqrt{2} \bigwedge \text{Im}(z) > 0$$

01.28.27.3529.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = -2\,\text{sech}^{-1}(z) + \pi i \;/;\; |z| > \sqrt{2} \bigwedge \text{Im}(z) < 0$$

01.28.27.3530.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\left(\theta\left(\left|\sqrt{z^2-1}\right|-1\right) + \frac{\sqrt{z^2}}{z} - 1\right)\pi - \frac{2\sqrt{z-1}\sqrt{z^2}}{\sqrt{\frac{1}{z}-1}\;z^{3/2}}\,\text{sech}^{-1}(z)\right)$$

01.28.27.3531.01

$$\coth^{-1}\left(\frac{z^2-2}{2\sqrt{1-z^2}}\right) = -\frac{\pi}{2\sqrt{1-z^2}}\left((z^2-2)\sqrt{\frac{z^4}{z^2-1}}\sqrt{\frac{z^2-1}{z^4}}\sqrt{\frac{z^2-1}{(z^2-2)^2}} - \sqrt{1-\frac{1}{z^2}}\, z\left(\sqrt{\frac{1}{z^2}}\, z - \sqrt{\frac{z-1}{z}}\sqrt{\frac{z}{z-1}} + \sqrt{\frac{i}{z}}\sqrt{-i\,z} - \sqrt{-\frac{i}{z}}\sqrt{i\,z} + \sqrt{1+\frac{1}{z}}\sqrt{\frac{z}{z+1}}\right)\right) - \frac{2z}{\sqrt{1-z^2}}\sqrt{1-\frac{1}{z^2}}\left(\frac{\pi}{2} - \frac{\sqrt{-1+z}\sqrt{z}}{\sqrt{1-z}}\sqrt{\frac{1}{z}}\operatorname{sech}^{-1}(z)\right)$$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$

Involving $\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right)$ and $\operatorname{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3532.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} - 2\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /;\ 0 \le \arg(z) < \frac{\pi}{2}$$

01.28.27.3533.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{\pi i}{2} - 2\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /;\ -\frac{\pi}{2} < \arg(z) < 0$$

01.28.27.3534.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{3\pi i}{2} + 2\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /;\ \frac{\pi}{2} < \arg(z) < \pi$$

01.28.27.3535.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{3\pi i}{2} + 2\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /;\ -\pi < \arg(z) < -\frac{\pi}{2}$$

01.28.27.3536.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\pi i}{2} + 2\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /;\ (i\,z \in \mathbb{R} \land i\,z > 0)$$

01.28.27.3537.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{3\pi i}{2} - 2\operatorname{sech}^{-1}\left(\frac{1}{z}\right) /;\ (i\,z \in \mathbb{R} \land i\,z < 0) \lor (z \in \mathbb{R} \land -1 < z < 0)$$

01.28.27.3538.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = -\frac{5\pi i}{2} + 2\,\text{sech}^{-1}\left(\frac{1}{z}\right) /; (z \in \mathbb{R} \land z < -1)$$

01.28.27.3539.01

$$\coth^{-1}\left(\frac{2z\sqrt{z^2-1}}{1-2z^2}\right) = \frac{\sqrt{1-z^2}}{\sqrt{z^2-1}}\left(\frac{\pi}{2}\left(-\sqrt{\frac{1}{1-z}}\sqrt{1-z} + \sqrt{\frac{1}{z+1}}\sqrt{z+1} - \sqrt{-iz}\sqrt{\frac{i}{z}} + \sqrt{-\frac{i}{z}}\sqrt{iz} + \frac{\sqrt{z^2}}{z} - 2\right) + \frac{2\sqrt{1-z}}{\sqrt{z-1}}\,\text{sech}^{-1}\left(\frac{1}{z}\right)\right)$$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$

Involving $\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right)$ and $\text{sech}^{-1}\left(\frac{1}{z}\right)$

01.28.27.3540.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = \pi i - 2\,\text{sech}^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{4} \le \arg(z) \le \frac{\pi}{2}$$

01.28.27.3541.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\pi i + 2\,\text{sech}^{-1}\left(\frac{1}{z}\right) /; \frac{\pi}{2} < \arg(z) \le \frac{3\pi}{4}$$

01.28.27.3542.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = \pi i + 2\,\text{sech}^{-1}\left(\frac{1}{z}\right) /; -\frac{3\pi}{4} \le \arg(z) \le -\frac{\pi}{2}$$

01.28.27.3543.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\pi i - 2\,\text{sech}^{-1}\left(\frac{1}{z}\right) /; -\frac{\pi}{2} < \arg(z) \le -\frac{\pi}{4}$$

01.28.27.3544.01

$$\coth^{-1}\left(\frac{1-2z^2}{2z\sqrt{z^2-1}}\right) = -\frac{\sqrt{z^2-1}}{\sqrt{1-z^2}}\left(\frac{2\sqrt{1-z}}{\sqrt{z-1}}\,\text{sech}^{-1}\left(\frac{1}{z}\right) + \frac{\pi}{2}\left(\frac{\sqrt{z^2-1}\,z}{\sqrt{z^4-z^2}} + \sqrt{\frac{1}{z}}\sqrt{\frac{1}{\sqrt{2}\,z-1}}\sqrt{\sqrt{2}\,z-1}\sqrt{z} - \sqrt{-\frac{1}{z}}\sqrt{-z}\sqrt{-\sqrt{2}\,z-1}\sqrt{-\frac{1}{\sqrt{2}\,z+1}} + \frac{\sqrt{z^2}}{z} - 2\right)\right)$$

History

– J. Houel (1878)

The function $\coth^{-1}$ is encountered often in mathematics and the natural sciences.

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