

$$\operatorname{arctanh} x = \frac{1}{2} \ln \left| \frac{x+1}{x-1} \right| \quad \Rightarrow \quad \text{Yes}$$

$$\tanh x = \frac{e^x - e^{-x}}{e^x + e^{-x}} \left( \frac{e^x}{e^x} \right)$$

$$= \frac{e^{2x} - 1}{e^{2x} + 1}$$

$$= \frac{e^{2x} + 1 - 1}{e^{2x} + 1}$$

$$\tanh x = 1 - \frac{1}{e^{2x} + 1}$$

$\Rightarrow$  now we can find inverse fun.

$$y = 1 - \frac{1}{e^{2x} + 1}$$

$$1 - y = \frac{1}{e^{2x} + 1}$$

$$e^{2x} + 1 = \frac{1}{1-y}$$

$$e^{2x} = \frac{1}{1-y} - 1$$

$$2x = \ln \left| \frac{1}{1-y} - 1 \right|$$

$$x = \frac{1}{2} \ln \left| \frac{1}{1-y} - 1 \right|$$

$$\begin{aligned} \Rightarrow \operatorname{arctanh} x &= \frac{1}{2} \ln \left| \frac{1}{1-x} - 1 \right| \\ &= \frac{1}{2} \ln \left| \frac{1-(1-x)}{1-x} \right| \\ &= \frac{1}{2} \ln \left| \frac{1+x}{1-x} \right| \\ &= \frac{1}{2} \ln \left| \frac{1+x}{x-1} \right| \\ & \text{(since } |1-x| = |x-1| \text{)} \end{aligned}$$