

Exercise 47

Calculate y' .

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

Solution

Calculate y' by using the chain rule.

$$\begin{aligned} y' &= \frac{d}{dx}[\cosh^{-1}(\sinh x)] \\ &= \frac{1}{\sqrt{(\sinh x)^2 - 1}} \cdot \frac{d}{dx}(\sinh x) \\ &= \frac{1}{\sqrt{\sinh^2 x - 1}} \cdot (\cosh x) \\ &= \frac{\cosh x}{\sqrt{\sinh^2 x - 1}} \end{aligned}$$