Exercise 41

Find the derivative. Simplify where possible.

$$y = \cosh^{-1}\sqrt{x}$$

Solution

Take the derivative using the chain rule.

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