

Exercise 34

Find the derivative. Simplify where possible.

$$F(t) = \ln(\sinh t)$$

Solution

Take the derivative using the chain rule.

$$\begin{aligned} F'(t) &= \frac{d}{dt}[\ln(\sinh t)] \\ &= \frac{1}{\sinh t} \cdot \frac{d}{dt}(\sinh t) \\ &= \frac{1}{\sinh t} \cdot (\cosh t) \\ &= \frac{\cosh t}{\sinh t} \\ &= \coth t \end{aligned}$$