Exercise 7

Prove the identity.

$$\sinh(-x) = -\sinh x$$

(This shows that sinh is an odd function.)

Solution

Use the definition of hyperbolic sine listed on page 259.

$$\begin{aligned}
\sinh(-x) &= \frac{e^{(-x)} - e^{-(-x)}}{2} \\
&= \frac{e^{-x} - e^{x}}{2} \\
&= -\frac{e^{x} - e^{-x}}{2} \\
&= -\sinh x
\end{aligned}$$