

**Exercise 2**

Find the numerical value of each expression.

(a)  $\tanh 0$

(b)  $\tanh 1$

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**Solution****Part (a)**

Use the definition of hyperbolic tangent listed on page 259.

$$\tanh 0 = \frac{\sinh 0}{\cosh 0} = \frac{\frac{e^0 - e^0}{2}}{\frac{e^0 + e^0}{2}} = \frac{e^0 - e^0}{e^0 + e^0} = \frac{1 - 1}{1 + 1} = 0$$

**Part (b)**

Use the definition of hyperbolic tangent listed on page 259.

$$\tanh 1 = \frac{\sinh 1}{\cosh 1} = \frac{\frac{e^1 - e^{-1}}{2}}{\frac{e^1 + e^{-1}}{2}} = \frac{e - e^{-1}}{e + e^{-1}} \times \frac{e}{e} = \frac{e^2 - e^0}{e^2 + e^0} \approx 0.761594$$