

**Exercise 6**

Differentiate.

$$y = \frac{e^x}{1 - e^x}$$

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**Solution**Use the quotient rule to differentiate  $y$ .

$$\begin{aligned} y' &= \frac{d}{dx} \left( \frac{e^x}{1 - e^x} \right) \\ &= \frac{\left[ \frac{d}{dx}(e^x) \right] (1 - e^x) - \left[ \frac{d}{dx}(1 - e^x) \right] (e^x)}{(1 - e^x)^2} \\ &= \frac{(e^x)(1 - e^x) - (-e^x)(e^x)}{(1 - e^x)^2} \\ &= \frac{e^x - e^{2x} + e^{2x}}{(1 - e^x)^2} \\ &= \frac{e^x}{(1 - e^x)^2} \end{aligned}$$