

Find the derivative of  $f(x) = \frac{-10e^{2x}}{x+1}$ .

To take this derivative, we must apply the quotient rule with

$$u = -10e^{2x}$$

$$v = x+1$$

The derivatives of these pieces are

$$u' = -10e^{2x} \cdot 2$$

$$v' = 1$$

For the derivative of u, the chain rule was used. Now put these pieces into the quotient rule,

$$\frac{vu' - uv'}{v^2} = \frac{(x+1)(-10e^{2x} \cdot 2) - (-10e^{2x})(1)}{(x+1)^2}$$

To simplify this expression, note that each term on top contains  $-10e^{2x}$ . Factor this out to give

$$\begin{aligned} f'(x) &= \frac{-10e^{2x} [(x+1) \cdot 2 - 1]}{(x+1)^2} \\ &= \frac{-10e^{2x} [2x+1]}{(x+1)^2} \end{aligned}$$

The brackets can be replaced with regular parentheses.