

3.8.57

Find dy/dt for $y = \ln(3te^{-t})$.Solution

By the Chain Rule (Theorem 3.2)
we have

$$\frac{dy}{dt} = \frac{1}{3te^{-t}} \left[[3](e^{-t}) + (3t)[e^{-t}[-1]] \right]$$

$$= \frac{1}{3te^{-t}} (3e^{-t} - 3te^{-t})$$

$$= \frac{3e^{-t}(1-t)}{3te^{-t}} = \frac{1-t}{t} = \boxed{\frac{1}{t} - 1} \cdot \square$$