

PROB. 11-33

$$v_0 = 45 \frac{\text{km}}{\text{h}}, \quad a = \text{CONSTANT}, \quad v_f = 99 \frac{\text{km}}{\text{h}}$$

$$x_0 = 0, \quad x_f = 0.2 \text{ km}, \quad \text{FIND } a, \quad t_f$$

$$v^2 = v_0^2 + 2a(x - x_0)$$

$$a = \frac{v^2 - v_0^2}{2(x - x_0)} = \frac{v_f^2 - v_0^2}{2(x_f - x_0)}$$

$$a = \left[\frac{(99^2 - 45^2) \frac{\text{km}^2}{\text{h}^2}}{2(0.2 \text{ km})} \right] \cdot \left(\frac{1000 \text{ m}}{\text{km}} \right) \left(\frac{\text{h}}{3600 \text{ s}} \right)^2 = 1.50 \frac{\text{m}}{\text{s}^2}$$

$$v = v_0 + at$$

$$t = \frac{v - v_0}{a}$$

$$t = \frac{(99 - 45) \frac{\text{km}}{\text{h}}}{(1.5 \frac{\text{m}}{\text{s}^2})} \cdot \left(\frac{1000 \text{ m}}{\text{km}} \right) \left(\frac{\text{h}}{3600 \text{ s}} \right) = 10.0 \text{ s}$$