

6.11

$$v_0 = 0$$

$$v_f = 40 \text{ m/s}$$

$$t = 0.5 \text{ s}$$

$$a = ?$$

$$v_f = v_0 + at$$

$$40 = 0 + a(2) \quad (0.5)$$

$$\boxed{a = 20 \text{ m/s}^2}$$

6.12

$$v_0 = 50 \frac{\text{km}}{\text{h}} \times \frac{1 \text{ h}}{3600 \text{ s}} \times \frac{1000 \text{ m}}{1 \text{ km}} = 13.89$$

$$a = 4 \text{ m/s}^2$$

$$t = 3 \text{ s}$$

$$v_f = ?$$

$$v_f = v_0 + at$$

$$= 13.89 + 4(3)$$

$$= \boxed{25.89 \text{ m/s}}$$

6.13

$$v_0 = 60 \frac{\text{mi}}{\text{h}} \times \frac{1 \text{ h}}{3600 \text{ s}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} = 88 \frac{\text{ft}}{\text{s}}$$

$$v_f = 0$$

$$x = 180 \text{ ft}$$

a) $a = ?$

$$v_f^2 = v_0^2 + 2ax$$

$$0^2 = 88^2 + 2a(180)$$

$$a = \frac{-88^2}{2(180)} = \boxed{-21.5 \text{ ft/s}^2}$$

b) $t = ?$

$$\bar{v} = \frac{x}{t} = \frac{v_f + v_0}{2}$$

$$\frac{180}{t} = \frac{0 + 88}{2}$$

$$2(180) = 88t$$

$$t = \frac{2(180)}{88} = \boxed{4.09 \text{ s}}$$