**10.** Convert 55 km/h to m/s

$$55 \text{ km/h} \times 1000 \text{ m/km} \times \frac{1 \text{ h}}{3\,600 \text{ s}} = 15.3 \text{ m/s}$$

$$v^2 = v_0^2 + 2ad$$
$$0 = (15.3 \text{ m/s})^2 + 2(a)(38 \text{ m})$$
$$a = -3.07 \text{ m/s}^2$$

Frictional force

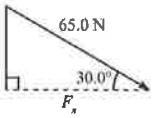
$$F_{fr} = F_{net} = ma$$
$$= (1165 \text{ kg})(-3.07 \text{ m/s}^2)$$
$$= -3.58 \times 10^3 \text{ N}$$

$$W = F_{fr} d$$
$$= (-3.58 \times 10^3 \text{ N})(38 \text{ m})$$
$$= -1.4 \times 10^5 \text{ J}$$

**11.** $d = vt$
$$= (2.00 \text{ m/s})(15.0 \text{ s})$$
$$= 30.0 \text{ m}$$

$$W = Fd$$
$$= (225 \text{ N})(30.0 \text{ m})$$
$$= 6.75 \times 10^3 \text{ J}$$

12.




Find the component of force along $x$ axis.

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$
$$\cos 30.0° = \frac{F_x}{65.0 \text{ N}}$$
$$F_x = 56.3 \text{ N}$$
$$W = F_x d$$
$$= (56.3 \text{ N})(10.0 \text{ m})$$
$$= 563 \text{ J}$$

**13.** $W = Fd$
$$= (3.5 \text{ N})(16.0 \text{ m})$$
$$= 56 \text{ J}$$

**14.** $W$ = area under force-displacement graph

area = area △ + area □

$$= \frac{1}{2}(l \times w) + (l \times w)$$
$$= \frac{1}{2}(3.0 \text{ m})(-4.0 \text{ N}) + (5.0 \text{ m})(-4.0 \text{ N})$$
$$= -26 \text{ J}$$

## *Lesson 2—Power*

## PRACTICE EXERCISES ANSWERS AND SOLUTIONS

**1.** $W = mgh$
$$= (45.0 \text{ kg})(9.81 \text{ m/s}^2)(6.0 \text{ m})$$
$$= 2.65 \times 10^3 \text{ J}$$

$$P = \frac{W}{t}$$
$$t = \frac{W}{P}$$
$$= \frac{2.65 \times 10^3 \text{ J}}{1.50 \times 10^3 \text{ W}}$$
$$= 1.8 \text{ s}$$

**2.** $P = \frac{W}{t}$
$$= \frac{mgh}{t}$$
$$= \frac{(20.0 \text{ kg})(9.81 \text{ m/s}^2)(2.50 \text{ m})}{2.00 \text{ s}}$$
$$= 245 \text{ W}$$

**3.** $v_{average} = \frac{v + v_0}{2}$
$$= \frac{3.00 \text{ m/s} + 0}{2}$$
$$= 1.50 \text{ m/s}$$

$$v^2 = v_0^2 + 2ad$$
$$(3.00 \text{ m/s})^2 = 2(a)(1.5 \text{ m})$$
$$a = 3.0 \text{ m/s}^2$$

$$F = ma$$
$$= (2.00 \text{ kg})(3.0 \text{ m/s}^2)$$
$$= 6.0 \text{ N}$$

$$P = Fv$$
$$= (6.0 \text{ N})(1.50 \text{ m/s})$$
$$= 90 \text{ W}$$