

Exercise 8-3

(a) First, find acceleration:

$$x = x_0 + v_0 t + \frac{1}{2} a t^2$$

↑ ↖ $v_0 = 0$
choose
 $x_0 = 0$

$$\therefore 11.5 = \frac{1}{2} a (4.50)^2$$

$$\therefore a = 1.136 \text{ m/s}^2$$

$$\Sigma F = ma$$

$$\therefore 85.0 = m (1.136)$$

$$\therefore m = 74.8 \text{ kg}$$

(b) After 1st 4.50 s,

$$\begin{aligned} v &= v_0 + at \\ &= 0 + (1.136)(4.50) \\ &= 5.112 \text{ m/s} \end{aligned}$$

After the person stops pushing,

$$\Sigma F = 0$$

$$\therefore a = 0$$

$$\therefore v = \text{constant}$$

$$\begin{aligned} \therefore \text{distance} &= v \cdot \Delta t \\ &= (5.112)(4.50) \\ &= 23.0 \text{ m} \end{aligned}$$