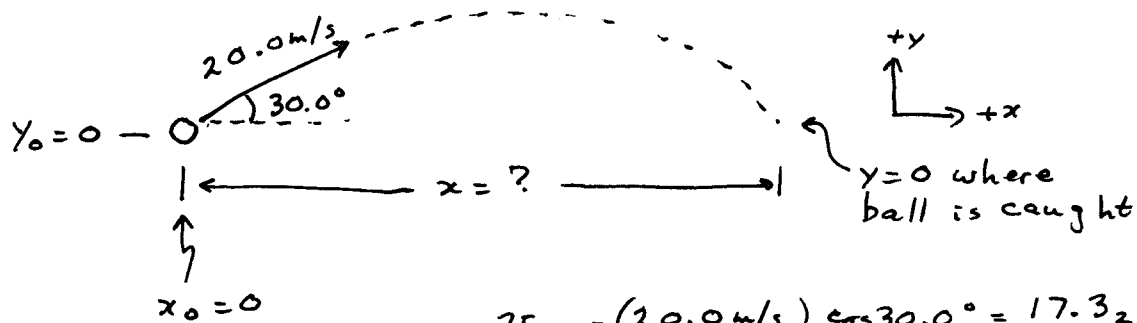


Exercise 7-13



$$v_{0x} = (20.0 \text{ m/s}) \cos 30.0^\circ = 17.32 \text{ m/s}$$

$$v_{0y} = (20.0 \text{ m/s}) \sin 30.0^\circ = 10.0 \text{ m/s}$$

$$a_y = -9.80 \text{ m/s}^2$$

$$a_x = 0 \therefore v_x = v_{0x}$$

1st, calculate time in air.

$$\text{Use: } y = y_0 + v_{0y}t + \frac{1}{2}a_y t^2$$

$$0 = 0 + 10.0t - 4.90t^2$$

$$\therefore t = 0 \text{ (throwing)} \text{ or } t = \frac{10.0}{4.90} \text{ (catching)}$$

$$= 2.04, \text{ s}$$

In x -direction, $v_x = \text{const.} = v_{0x}$

$$\therefore x = x_0 + v_{0x}t$$

$$= 0 + (17.32 \text{ m/s})(2.04, \text{ s})$$

$$= 35.4 \text{ m}$$

(or 35.3 m if more than 4 digits are kept in intermediate answers).