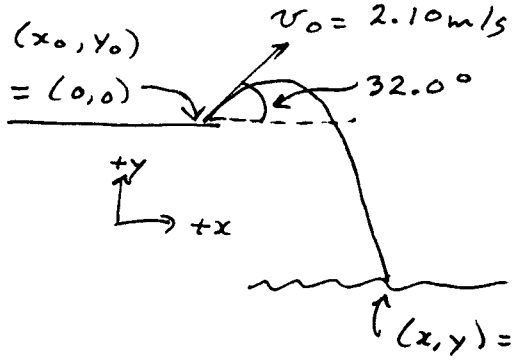
# Problem 7-27

(a)




$v_{0x} = 2.10 \cos 32.0° = 1.781 \text{ m/s}$

$v_{0y} = 2.10 \sin 32.0° = 1.113 \text{ m/s}$

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

$(x, y) = (x, -15.0\text{m})$

$$y = y_0 + v_{0y} t + \tfrac{1}{2} a_y t^2$$

$$\therefore \; -15.0 = 0 + 1.113\, t - 4.90\, t^2$$

$$\therefore \; 4.90\, t^2 - 1.113\, t - 15.0 = 0$$

$$\therefore \; t = \frac{1.113 \pm \sqrt{(1.113)^2 - 4(4.90)(-15.0)}}{9.80}$$

- need $t > 0$ $\therefore$ choose positive root

$$\Rightarrow t = 1.87 \text{ s} \quad (1.86_7 \text{ s})$$

(b)


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

$$= 0 + (1.78_1)(1.86_7)$$

$$= 3.32_5 \text{ m}$$

$$\therefore \; \Delta r = \sqrt{(15.0)^2 + (3.32_5)^2} \text{ m}$$

$$= 15.4 \text{ m}$$