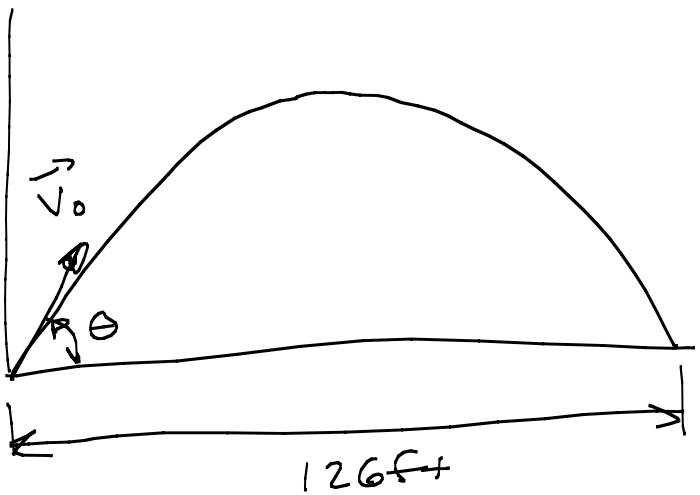
Problem 2

Given: $t = 3.6\,\text{sec}$

Determine: $-v_0$

$-\theta$



Horizontal Motion ($a_x = 0$)

$$x = x_0 + (v_0)_x t$$

$$126\,\text{ft} = 0 + (v_0)_x (3.6\,\text{sec})$$

$$\boxed{(v_0)_x = 35\,\text{ft/s}}$$

Vertical Motion ($a_y = -32.2\,\text{ft/sec}^2$)

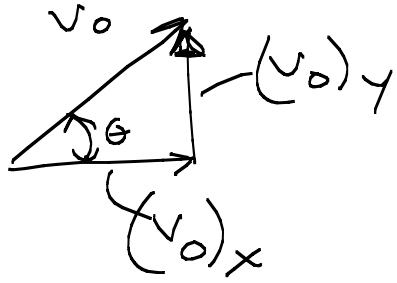
$$y = y_0 + (v_0)_y t + \frac{1}{2} a_y t^2$$

$$0 = 0 + (v_0)_y (3.6\,\text{sec}) + \frac{1}{2}(-32.2\,\text{ft/sec}^2)(3.6\,\text{sec})^2$$

$$(v_o)_y = 57.96 \text{ ft/sec}$$

$$v_o = \sqrt{(v_o)_x^2 + (v_o)_y^2} = \sqrt{(35)^2 + (57.96)^2} = 67.7 \text{ ft/sec}$$

$$\tan\theta = \frac{(v_o)_y}{(v_o)_x}$$



$$\tan\theta = \frac{57.96 \text{ ft/sec}}{35 \text{ ft/sec}}$$

$$\theta = 58.9^\circ$$