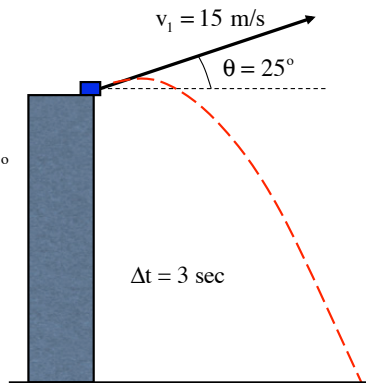


Problem 3.29

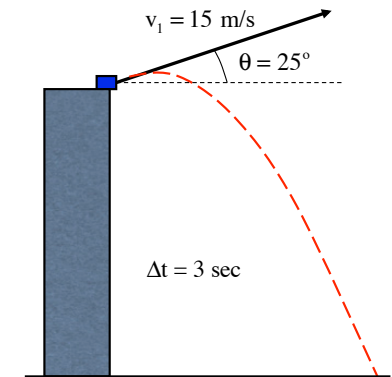
A ball moving 15 m/s is thrown from a roof top at an angle of $\theta = 25^\circ$. If it takes 3 seconds to hit the ground, how tall is the building?



0.)

How tall is the building?

Taking the ball's initial position to be $y=0$ (we could have used the ground as $y=0$, but we're doing it this to show that there is no difference as long as you keep your signs straight), we can write:

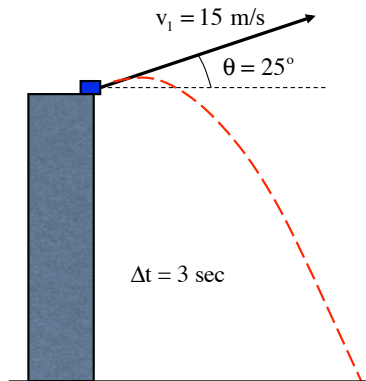


$$y_2 = y_1 + v_{1,y}t + (1/2)a_y t^2$$
$$\Rightarrow y_2 = 0 + [(15 \text{ m/s})\sin 25^\circ](3 \text{ s}) + (1/2)(-9.8 \text{ m/s}^2)(3 \text{ s})^2$$
$$\Rightarrow y_2 = -29.6 \text{ meters}$$

2.)

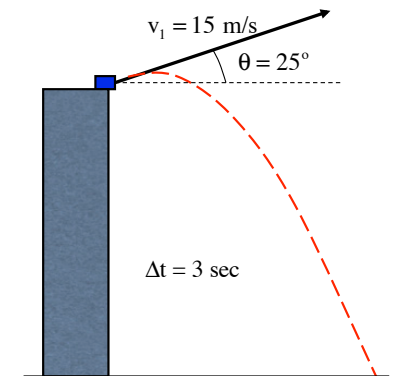
Problem 3.29

How tall is the building?



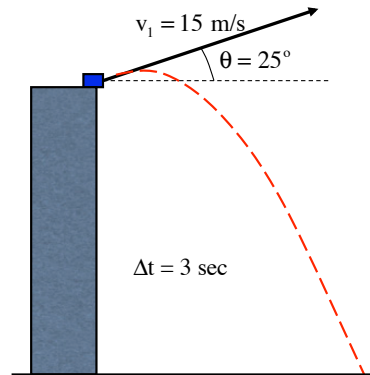
1.)

How far did the brick travel?



3.)

How far did the brick travel?



$$x_2 = x_1 + v_{1,x}t + (1/2)a_x t^2$$

$$\Rightarrow x_2 = 0 + v_{1,x}t + 0$$

$$\Rightarrow x_2 = [(15 \text{ m/s}) \cos 25^\circ](3 \text{ s})$$

$$\Rightarrow x_2 = 3.88 \text{ meters}$$