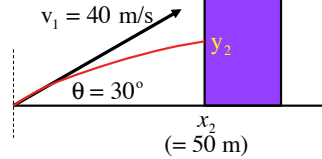


Problem 3.32

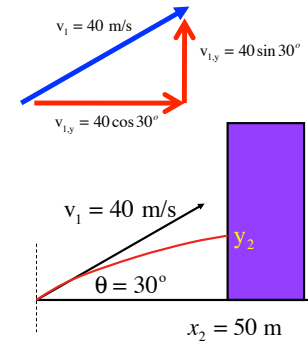
A fire hose shoots water at 40 m/s. If it is aimed at $\theta = 30^\circ$ a distance 50 meters from a building, how far up will the stream hit the building?



1.)

With the hose firing as shown, where will it hit on the building?

$$\begin{aligned}x_2 &= x_1 + v_{1,x}t + (1/2)a_x t^2 \\ \Rightarrow x_2 &= 0 + v_{1,x}t + 0 \\ \Rightarrow (50 \text{ m}) &= [(40 \text{ m/s})\cos 30^\circ]t \\ \Rightarrow t &= 1.44 \text{ seconds}\end{aligned}$$

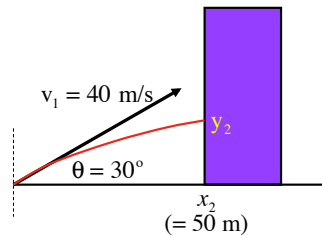


$$\begin{aligned}y_2 &= y_1 + v_{1,y}t + (1/2)a_y t^2 \\ \Rightarrow y_2 &= 0 + [(40 \text{ m/s})\sin 30^\circ](1.44 \text{ s}) + (1/2)(-9.8 \text{ m/s}^2)(1.44)^2 \\ \Rightarrow y_2 &= 18.6 \text{ meters}\end{aligned}$$

2.)

Problem 3.32

With the hose firing as shown, where will it hit on the building?



1.)