

**Physics 101Rec**  
**Quiz#3**  
**Chapter 4d**

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Name: Key

Id:

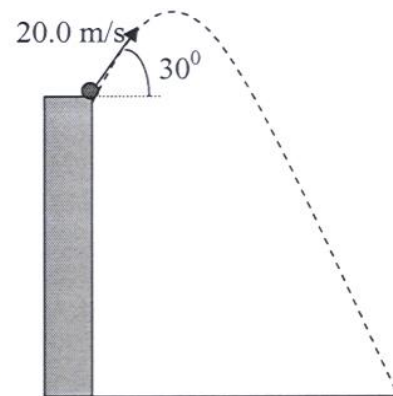
Sect:

A stone is thrown from the top of a building upward at an angle of  $30.0^\circ$  to the horizontal and with an initial speed of  $20.0 \text{ m/s}$  as shown in the figure. The ball hits the ground after  $4.22 \text{ sec}$  in flight.

(a) How high is the building?

$$\begin{aligned}
 y - y_0 &= v_{0y}t - \frac{1}{2}gt^2 \\
 &= v_0 \sin \theta t - \frac{1}{2}gt^2 \\
 &= 20 \sin 30^\circ \times 4.22 - 4.9 \times (4.22)^2 \\
 &= -45 \text{ m}
 \end{aligned}$$

The height of the building is 45 m



(b) Where does the ball strike the ground?

$$\begin{aligned}
 x - x_0 &= v_{0x}t = v_0 \cos \theta t \\
 &= 20 \cos 30^\circ \times 4.22 = \boxed{73.1 \text{ m}}
 \end{aligned}$$