

Physics 101Rec
Quiz#3
Chapter 4d

Instructor: Dr. A. Mekki

Name: Key

Id:

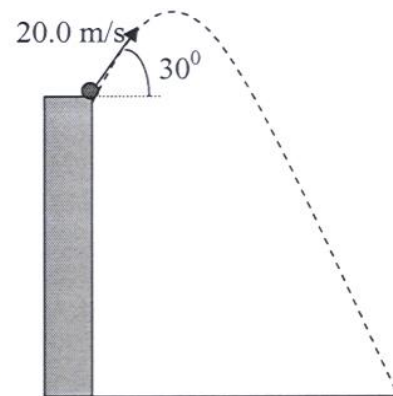
Sect:

A stone is thrown from the top of a building upward at an angle of 30.0° to the horizontal and with an initial speed of 20.0 m/s as shown in the figure. The ball hits the ground after 4.22 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?

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