

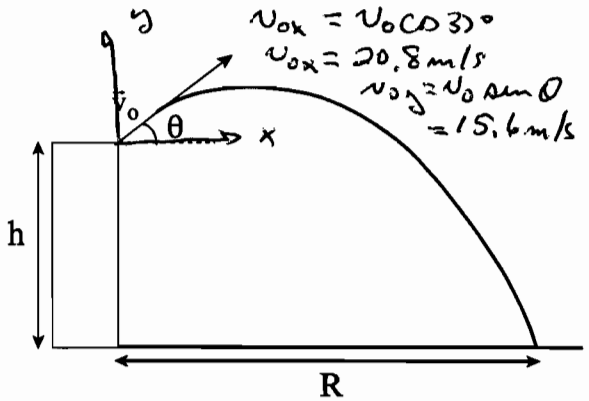
EXAM 2

Name: \_\_\_\_\_

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[24 pts.] A rock is hurled from the top of a three-story building ( $h = 12.0$  m) with a velocity ( $\vec{v}_0$ ) of 26.0 m/s at an angle of  $37.0^\circ$  ( $\theta$ ) above the horizontal (see drawing). Find the horizontal distance ( $R$ ) of the rock just as it hits the ground.



FIRST FIND TIME OF FLIGHT TO GROUND FOR CS CHOSEN  $y = -12.0$  m

$$y = y_0 + v_{0y}t + \frac{1}{2}a_y t^2$$

$y_0 = 0$   
 $x_0 = 0$

$$-12.0 \text{ m} = 0 + (15.6 \text{ m/s})t - (4.9 \text{ m/s}^2)t^2$$

$$4.9 \text{ m/s}^2 t^2 - 15.6 \text{ m/s} t - 12.0 \text{ m} = 0$$

USE QUADRATIC

$$t = \frac{15.6 \pm \sqrt{(-15.6)^2 - 4(4.9)(-12.0)}}{9.8} = \frac{15.6 \pm 21.9}{9.8}$$

$$t = \boxed{3.82 \text{ s}}, -0.643 \text{ s}$$

CALCULATE R

$$x = R = x_0 + v_{0x}t$$

$$R = (20.8 \text{ m/s})(3.82 \text{ s})$$

$$\boxed{R = 79.5 \text{ m}}$$