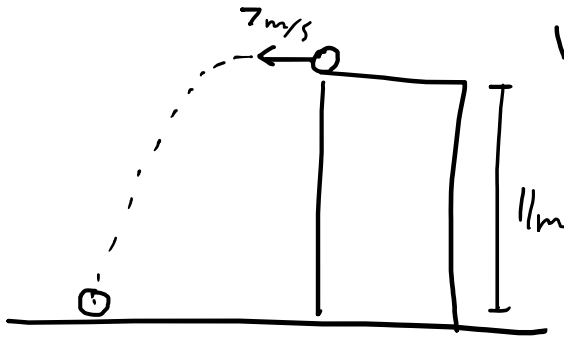


20-P-KM-NW-010

A student's report card is crushed into a ball and kicked horizontally with an initial velocity of $v_i = 7 \text{ m/s}$ off the roof of a building 11 m tall. Determine the speed of the ball upon impact and treat $g = 9.8 \text{ m/s}^2$.



$$v_{0y} = 0, \quad a_y = -g, \quad \Delta y = -11 \text{ m}$$

$$v_x = 7 \text{ m/s}$$

will have constant acceleration in y and constant velocity in x .

$$v_{x0} = v_{xf} = 7 \text{ m/s}$$

$$v_{yf}^2 = v_{y0}^2 + 2a_y \Delta y$$

$$v_{yf}^2 = 2(-g)(-11) = 22g$$

$$v_f = \sqrt{v_{yf}^2 + v_{xf}^2}$$

$$v_f = \sqrt{22g + 49} = \boxed{16.26 \text{ m/s}}$$

