HW3-1 Soln)

Put the origin at the foot of the building and make upward positive y. We'll make out from the building be positive x.

$$x_i = 0 m$$
 $y_i = 26 m$ $x_f = +12 m$ $y_f = 0 m$ $v_{xi} = ? \leftarrow$ $v_{yi} = 0 m/s$ $v_{xf} = ?$ $v_{yf} = ?$ $a_x = 0 m/s^2$ $a_y = -10 m/s^2$ $t = ?$

Clearly not enough information on the x side. Try going to the y side to find the time. (3)

$$y = y_i + v_{yi}t + \frac{1}{2}a_y t^2$$

$$0 = 26 + 0 + \frac{1}{2}(-10) t^2$$

$$t = \sqrt{\frac{(-26)2}{-10}} = 2.28 \text{ seconds} \quad .$$

Then, (3) again:

$$x = x_i + v_i t + \frac{1}{2} a t^2$$
$$v_i = \frac{x - x_i - \frac{1}{2} a t^2}{t} = \frac{12 - 0 - 0}{2.28} = \frac{5.26 \text{ m/s}}{5.26 \text{ m/s}}.$$