

A soccer ball is kicked horizontally at 15.8 m/s off the top of a field house and lands 33.9 meters from the base of the field house. Determine the height of the field house.

$y_i =$  \_\_\_\_\_  
 $(V_x)_i = 15.8 \frac{m}{s}$   
 $(V_y)_i = 0 \frac{m}{s}$   
 $V_i = 15.8 \frac{m}{s}$   
 $x_i = 0 m$   
 $t_i = 0 s$

$\bar{a} = -9.8 \frac{m}{s^2}$

$\Delta X = 33.9 m$

$(V_x)_f = 15.8 \frac{m}{s}$   
 $(V_y)_f =$  \_\_\_\_\_  $\frac{m}{s}$   
 $V_f =$  \_\_\_\_\_  $\frac{m}{s}$   
 $x_f = 33.9 m$   
 $t_f =$  \_\_\_\_\_  $s$   
 $y_f = 0 m$

$\Delta y = \frac{1}{2} \bar{a} t^2$   
 \* Solve for t first! \*  
 $\Delta X = (V_x)_i t$   
 $(33.9 m) = (15.8 \frac{m}{s}) t$   
 $\therefore t = 2.1456 s$

$\Delta y = \frac{1}{2} (-9.8 \frac{m}{s^2}) (2.1456 s)^2$   
 $\Delta y = -22.56 m$   
**Height = 22.6 m**

### Vertically Launched Projectile Motion

$(V_y)_f = V_f \sin \Phi$   
 $(V_x)_f = V_f \cos \Phi$

@ max height  
 $(V_x)_{max} =$  \_\_\_\_\_  $\frac{m}{s}$   
 $(V_y)_{max} = 0 \frac{m}{s} *$   
 $V_{max} = (V_x)_{max}$   
 $x_{max} =$  \_\_\_\_\_  $m$   
 $y_{max} =$  \_\_\_\_\_  $m$   
 $t_{max} =$  \_\_\_\_\_  $s$

$V_i =$  \_\_\_\_\_  $\frac{m}{s}$   
 $(V_x)_i =$  \_\_\_\_\_  $\frac{m}{s}$   
 $(V_y)_i =$  \_\_\_\_\_  $\frac{m}{s}$   
 $x_i =$  \_\_\_\_\_  $m$   
 $y_i =$  \_\_\_\_\_  $m$   
 $t_i =$  \_\_\_\_\_  $s$

$V_i = \sqrt{(V_x)_i^2 + (V_y)_i^2}$   
 $(V_x)_i = V_i \cos \theta$   
 $(V_y)_i = V_i \sin \theta$

$\bar{a} = -9.8 \frac{m}{s^2}$

$(V_x)_f = (V_x)_i$   
 $(V_y)_f =$  \_\_\_\_\_  $\frac{m}{s}$   
 $V_f = \sqrt{(V_x)_f^2 + (V_y)_f^2}$   
 $V_f =$  \_\_\_\_\_  $\frac{m}{s}$   
 $x_f =$  \_\_\_\_\_  $m$   
 $y_f =$  \_\_\_\_\_  $m$   
 $t_f =$  \_\_\_\_\_  $s$