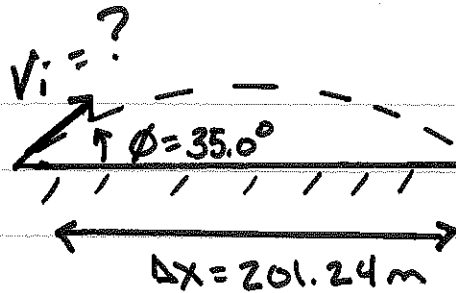


#1) Given:



$\Delta y = 0$   $g = 9.81 \text{ m/s}^2$

Find:  $V_i = ?$

Soln:

x-dir  
 $\Delta x = V_i \cos \phi \Delta t$

$\Delta t = \frac{\Delta x}{V_i \cos \phi}$

y-dir  
 $\Delta y = V_i \sin \phi \Delta t - \frac{1}{2} g \Delta t^2$   $\Delta y = 0$   
 @ 201.24

$V_i = \frac{g \Delta t}{2 \sin \phi}$

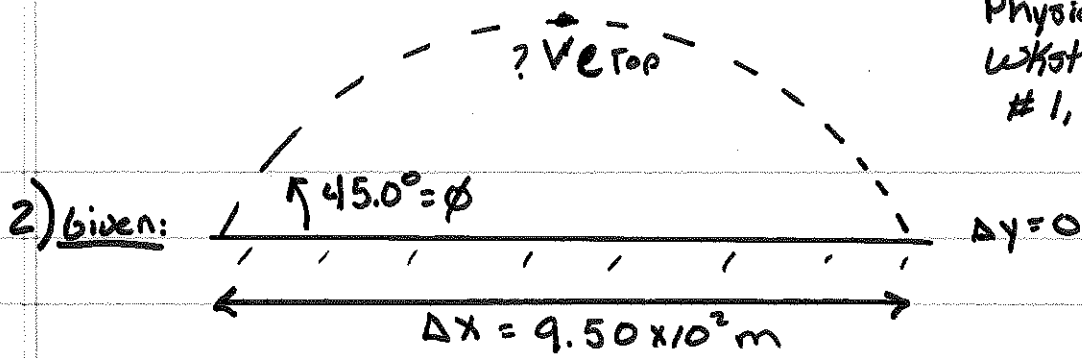
sub in  $V_i$

sub in  $\Delta t$

$V_i = \frac{g \Delta x}{V_i 2 \sin \phi \cos \phi}$   
 $V_i^2 = \frac{g \Delta x}{2 \sin \phi \cos \phi}$

$= \sqrt{\frac{(9.81 \text{ m/s}^2)(201.24 \text{ m})}{2(\sin 35.0)(\cos 35.0)}}$

$V_i = 45.8 \text{ m/s}$



2) Given:

Find:  $V @ \text{Top}$ ?  $V_y = 0 \therefore V = V_x @ \text{Top}$

Solve:

X-dir

$$\Delta x = V_i \cos \phi \Delta t$$

$$\Delta t = \frac{\Delta x}{V_i \cos \phi}$$

Y-dir

$$\Delta y = V_i \sin \phi \Delta t - \frac{1}{2} g \Delta t^2$$

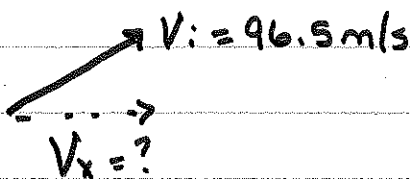
$$V_i = \frac{g \Delta t}{2 \sin \phi}$$

$$V_i = \frac{g \Delta x}{V_i 2 \sin \phi \cos \phi}$$

$$V_i^2 = \frac{g \Delta x}{2 \sin \phi \cos \phi}$$

$$V_i = \sqrt{\frac{(9.81 \text{ m/s}^2)(9.50 \times 10^2 \text{ m})}{2 \sin 45.0 \cos 45.0}}$$

$$V_i = 96.5 \text{ m/s}$$



$$V_x = V_i \cos \phi$$

$$= (96.5 \text{ m/s})(\cos 45.0)$$

$$V_x = 68.2 \text{ m/s}$$

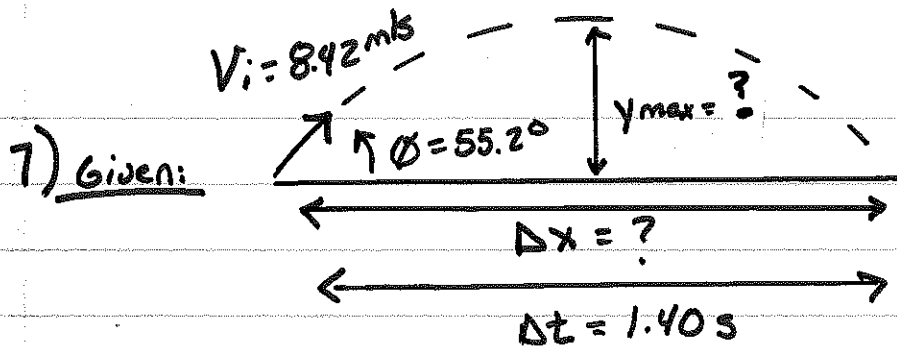
Notes

x-dir 2?

$\Delta y = 0 @ \Delta x$

Solve for  $V_i$

Subst into  $V_i$



$g = 9.81 \text{ m/s}^2$

Soln:

x-dir

y-dir

$$\Delta x = V_i \cos \theta \Delta t$$

$$= (8.42 \text{ m/s}) \cos 55.2^\circ (1.40 \text{ s})$$

$\Delta x = 6.73 \text{ m}$

Note

$$\Delta y = V_i \sin \theta \Delta t - \frac{1}{2} g \Delta t^2 \quad y_{\text{max}} @ \frac{\Delta t}{2}$$

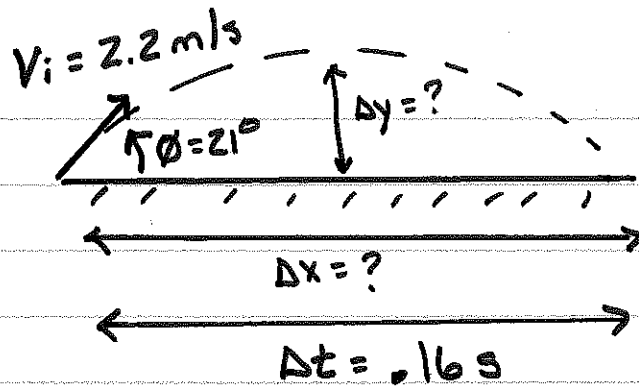
$$y_{\text{max}} = V_i \sin \theta \frac{\Delta t}{2} - \frac{1}{2} g \left( \frac{\Delta t}{2} \right)^2$$

$$= (8.42 \text{ m/s}) \sin 55.2^\circ \left( \frac{1.40 \text{ s}}{2} \right) - \frac{1}{2} (9.81 \text{ m/s}^2) \left( \frac{1.40}{2} \right)^2$$

$$= 4.84 \text{ m} - 2.40 \text{ m}$$

$y_{\text{max}} = 2.44 \text{ m}$  Fence height

8) Given:



$g = 9.81 \text{ m/s}^2$

Find:  $\Delta x = ?$

$\Delta y = ?$  which is  $y_{\text{max}}$

X-dir

$$\Delta x = V_i \cos \theta \Delta t$$

$$= (2.2 \text{ m/s}) \cos 21^\circ (.16 \text{ s})$$

$\Delta x = .33 \text{ m}$

y-dir

$$\Delta y = V_i \sin \theta \Delta t - \frac{1}{2} g \Delta t^2$$

note  
 $y_{\text{max}} @ \frac{\Delta t}{2}$

$$y_{\text{max}} = V_i \sin \theta \frac{\Delta t}{2} - \frac{1}{2} g \left(\frac{\Delta t}{2}\right)^2$$

$$= (2.2 \text{ m/s}) \sin 21^\circ \left(\frac{.16 \text{ s}}{2}\right) - \frac{1}{2} (9.81 \text{ m/s}^2) \left(\frac{.16 \text{ s}}{2}\right)^2$$

$$= .063 \text{ m} - .031 \text{ m}$$

$y_{\text{max}} = .032 \text{ m}$   
 or  
 $3.2 \text{ cm}$