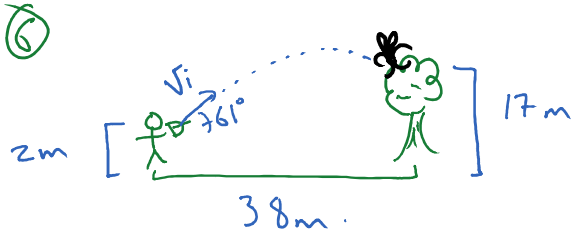
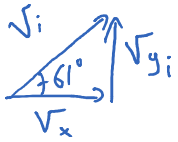
Example of #6

February 16, 2017 8:24 AM

(6)





$V_{y_i} = V_i \sin 61$

$V_x = V_i \cos 61$

Vertical

→ $V_{y_i} = V_i \sin 61$

$V_{y_f} =$

→ $a = -9.8 m/s^2$

→ $dy = 17 - 2$

$= 15m$

→ $t =$

Horizontal ($a = 0$)

$V_x = V_i \cos 61$

$dx = 38m$

$t =$

$d_x = V_x \cdot t$

$$t = \frac{38}{V_i \cos 61} \quad Eq\ 1$$

Sub ↓

$d = V_i t + \frac{1}{2} a t^2$

$$15 = V_i \sin(61)\, t - 4.9 t^2 \quad Eq\ 2$$

$$\frac{\sin\theta}{\cos\theta} = \tan\theta$$

$$15 = \cancel{V_i} \sin(61)\left[\frac{38}{\cancel{V_i}\cos 61}\right] - 4.9\left[\frac{38}{V_i \cos 61}\right]^2$$

$$15 = 38 \tan(61) - 4.9\left[\frac{38}{V_i \cos 61}\right]^2$$

$$V_i^2 \left(15 - 38\tan 61\right) = (-4.9)(38)^2 \times \left(V_i^2\right)$$

$$\frac{V_i^2 \left(15 - 38\tan 61\right)}{V_i^2 \cos^2 61} = \frac{-(4.9)(38)^2}{(\cos^2 61)(15 - 38\tan 61)}$$

$$V_i^2 = \frac{-(9.9)(38)^2}{[\cos^2(61)][15 - 38\tan 61]}$$

$$\sqrt{V_i^2} = \sqrt{562}$$

$$V_i = 24 \text{ m/s}$$

Correction

#8 $d_x = 12\text{m}$