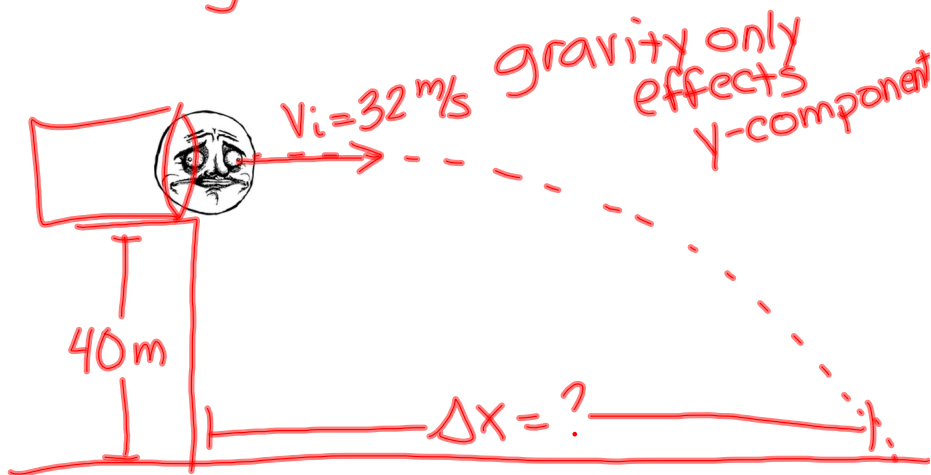


# Acceleration due to gravity

straight down

$$g = 9.8 \text{ m/s}^2$$



$$\begin{aligned} \underline{x} \\ v_{ix} &= 32 \text{ m/s } \hat{x} \\ a_x &= 0 \text{ m/s}^2 \hat{x} \\ \Delta x &= ? \\ t &= 2.86 \text{ s} \end{aligned}$$

$$\begin{aligned} \Delta x &= v_i t + \frac{1}{2} a t^2 \\ \Delta x &= 32(2.86) \end{aligned}$$

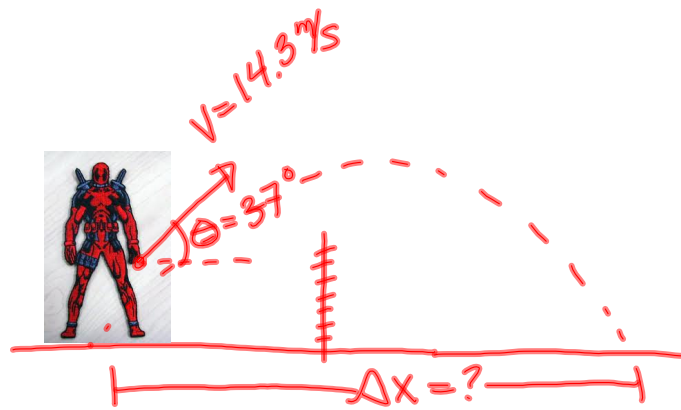
$$\boxed{\Delta x = 91.5 \text{ m}}$$

$$\begin{aligned} \underline{y} \\ v_{iy} &= 0 \text{ m/s } \hat{y} \\ a_y &= -9.8 \text{ m/s}^2 \hat{y} \\ \Delta y &= -40 \text{ m } \hat{y} \\ t &= ? \end{aligned}$$

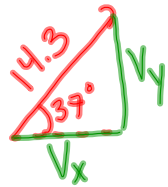
$$\begin{aligned} \Delta x &= v_i t + \frac{1}{2} a t^2 \\ -40 &= 0 + \frac{1}{2} (-9.8) t^2 \end{aligned}$$

$$\frac{-40}{-4.9} = t^2$$

$$\begin{aligned} \sqrt{8.16} &= \sqrt{t^2} \\ t &= 2.86 \text{ s} \end{aligned}$$



split velocity



$$V_y = V \sin \theta$$

$$V_x = V \cos \theta$$

$$\underline{x} \quad V_i = 14.3 \cos 37 = 11.42 \text{ m/s } \hat{x}$$

$$\underline{y} \quad V_i = 14.3 \sin 37$$

$$V_i = 8.61 \text{ m/s } \hat{y}$$

$$a_x = 0$$

$$a_y = -9.8 \text{ m/s}^2$$

$$t = 1.76 \text{ s}$$

$$\Delta y = 0$$

$$\Delta x = v_i t + \frac{1}{2} a t^2 = 0$$

$$\Delta x = v_i t + \frac{1}{2} a t^2$$

$$\Delta x = 11.42(1.76)$$

$$0 = 8.61 t + \frac{1}{2}(-9.8)t^2$$

$$\boxed{\Delta x = 20.09 \text{ m}}$$

$$0 = 8.61 t - 4.9 t^2$$

$$0 = t(8.61 - 4.9t)$$

$$\cancel{0} \quad 8.61 - 4.9t = 0$$

$$\frac{8.61}{4.9} = 4.9t$$

$$t = 1.76 \text{ s}$$

## Solving polynomial EQ's

$$ax^2 + bx + c$$

$$at^2 + bt + c$$

$$8t^2 + 5t = 0$$

$$t(8t + 5) = 0$$

$$\cancel{t=0}$$

$$8t + 5 = 0$$

$$t = -5/8$$