PARAMETRIC EQUATIONS

Equations that describe the horizontal & vertical motion of an object in terms of time.

$$h(t) = \frac{1}{2}at^2 + V_0t + S_0$$

$y = r\sin\theta$

$x = r\cos\theta$

$$x_t = |v|t\cos\theta$$

$$y_t = \frac{1}{2}at^2 + |v|t\sin\theta + S_0$$

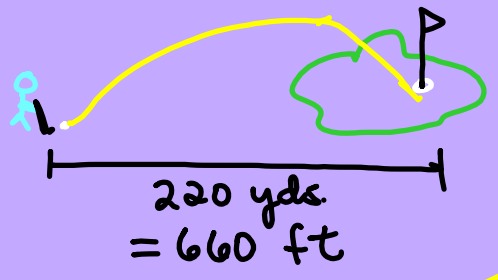
$$y_t = \frac{1}{2}at^2 + |v|t\sin\theta + S_0$$

$a = -32\ \frac{ft}{sec^2}$

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

$$\frac{\Delta v}{\Delta t} = \frac{\frac{m}{sec}\cdot\frac{1}{sec}}{\frac{sec}{1}}$$

Kaileg estimates the distance to the pin to be 220 yds. Her swing will produce an initial velocity of 160 ft/s at an angle of 28°. Will the ball land in the hole?



$x_t = |v|t\cos\theta$

$y_t = \frac{1}{2}at^2 + |v|t\sin\theta + s_0$

$x_t = 160t\cos 28°$

$y_t = \frac{1}{2}(-32)t^2 + 160t\sin 28° + 0$

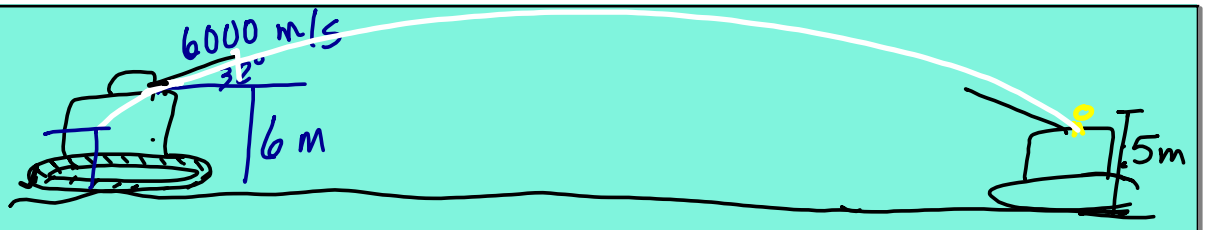
$y_t = -16t^2 + 160t\sin 28°$

$\frac{660}{160\cos 28°} = \frac{160t\cos 28°}{160\cos 28°}$

$4.7 \text{ sec} = t$

$y_t = -16(4.7)^2 + 160(4.7)\sin 28°$

≈ -0.39



How far from the enemy tank must he launch to hit the ninja?

$a: -9.8$

$x_t = 6000t\cos 32^\circ$

$y_t = -4.9t^2 + 6000t\sin 32^\circ + 6$

$5 = -4.9t^2 + 6000t\sin 32^\circ + 6$

-5

$0 = -4.9t^2 + 6000t\sin 32^\circ + 1$

$$t = \frac{-6000\sin 32^\circ \pm \sqrt{(6000\sin 32^\circ)^2 - 4(-4.9)(1)}}{2(-4.9)}$$

$t = -0.000314$

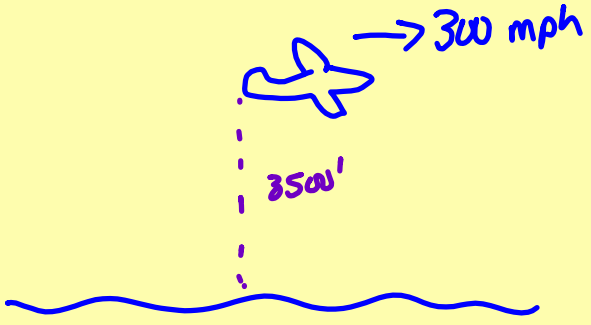
$t = 648.88$ sec

$x_t = 6000(648.88)\cos 32^\circ$

$x = 3{,}301{,}689$ m

$= 3{,}301.7$ Km

2



Direction = 0°