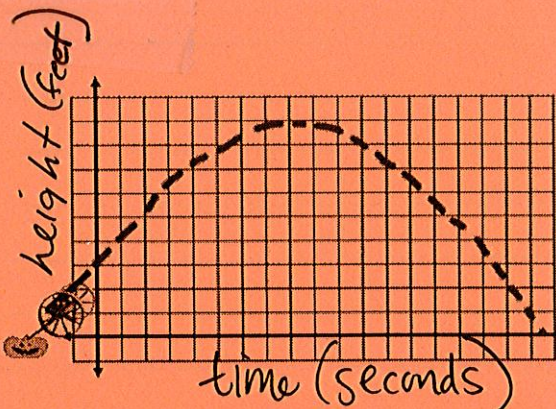
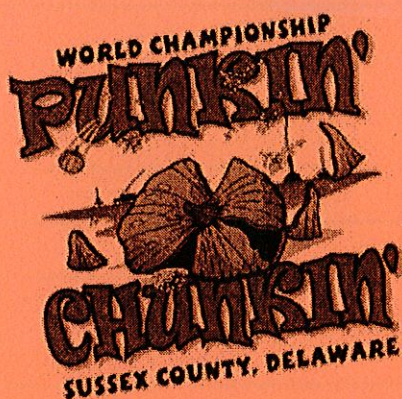


9/21/15

#9 Projectile Motion



(t, h)

$$h = h_0 + v_0 t - 16t^2$$

↑ initial height
↑ initial velocity
↑ Gravity

$h =$ height of projectile after t seconds

A pumpkin is launched into the air from a cannon that is 15 feet off the ground at an initial upward velocity of 90 feet per second.

Rule: $h = 15 + 90t - 16t^2$

Standard form = $h = -16t^2 + 90t + 15$

What is the height of the pumpkin after 3 seconds?

$$h = 15 + 90(3) - 16(3)^2 = 141 \text{ feet}$$

When will the pumpkin hit the ground?

Seconds $0 = 15 + 90t - 16t^2$
 $5.8 = t$

What is the maximum height of the pumpkin?

Vertex $x =$ time it took get to the max

$y =$ will be the max height $h = 141.56 \text{ ft}$

Calculator Steps

→ look in table 2nd, Graph

Graph $y=0$, equation 2nd, Trace, intersects

→ Vertex 2nd, Trace max

Ex 2) A rocket is launched from 101-foot cliff with an initial velocity of 116 feet per second.

(A) when will the rocket be at the highest point?

$$h = h_0 + v_0 t - 16t^2 \quad \begin{matrix} h_0 = 101 \\ v_0 = 116 \end{matrix} \quad h = 101 + 116t - 16t^2$$

Vertex

(3.6, 311.3)

$$t = 3.6 \text{ secs}$$

(B) What is the rocket's highest point?

$$h = 311.3 \text{ feet}$$

(C) when will the rocket hit the ground?

$$0 = 101 + 116t - 16t^2$$

$$8 \text{ } \cancel{5} = t$$

secs

Ex 3) A ball is thrown upward from a height of 15 ft with initial velocity of 5 feet per sec.

(A) what is the highest point the ball reaches

$$h = 15 + 5t - 16t^2$$

vertex

(B) what is its height after .7 secs?

$$t = .7$$

paycheck depends on hours worked