Good Morning!

Please make sure that your homework is turned in before the bell.

Grab a chromebook, put up your phones, and take your seats.

Quadratic Equations

1. The height of a thrown ball is a quadratic function of the time it has been in the air. The graph of the quadratic function is the parabolic path of the ball. The vertex of the graph is (1, 20), and the path of the ball includes the point (0, 4). What is an expression that defines this function. Write the quadratic function in vertex form and in standard form. What are the appropriate domain and range for this situation?

$h = 1$
$k = 20$

$y = a(x-h)^2 + k$

$y = a(x-1)^2 + 20$

$4 = a(0-1)^2 + 20$

$4 = a(-1)^2 + 20$

$-20 \quad -20$

$-16 = a$

$f(x) = ax^2 + bx + c$

$y = -16(x-1)^2 + 20$

$(x-1)(x-1)$

$y = -16(x^2 - 2x + 1) + 20$

$y = -16x^2 + 32x - 16 + 20$

$y = -16x^2 + 32x + 4$

Range : $[0, 20]$

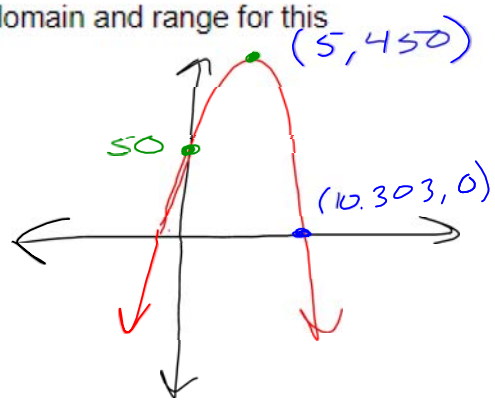
Domain : $[0, 2.118]$

2. A water balloon was thrown from a window. The height of the water balloon over time can be modeled by the function $y = -16x^2 + 160x + 50$. What was the height from which the water balloon was thrown? What are the appropriate domain and range for this situation?

50 units

Range: [0, 450]

Domain: [0, 10.303]



3. A pumpkin in launched from the ground into the air and lands 4.5 s later, after first reaching a max height of 81 feet 25m. Write a quadratic function that models the height, in feet, of the pumpkin x second after it was launched. What are the appropriate domain and range for this situation?

$y = a(x-0)(x-4.5)$

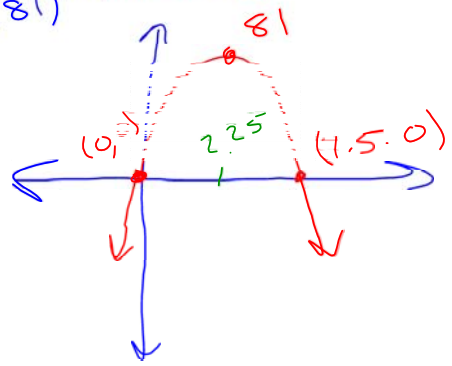
$y = a \times (x-4.5)$

$81 = a(2.25)(2.25-4.5)$

$\frac{81}{-5.06} = \frac{a(-5.06)}{-5.06}$

$-16.01 = a$

(2.25, 81)



$y = -16.01 \times (x-4.5)$

Range: $[0, 81]$

Domain: $[0, 4.5]$