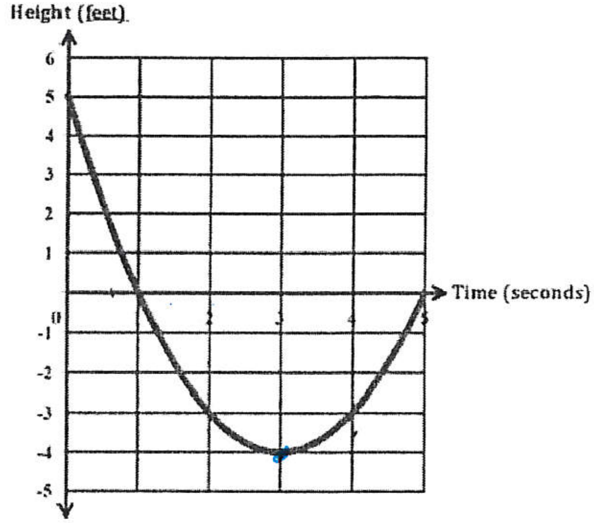
Applications of Quadratic Functions given a Graph

Name: Key Hr:_____

1. The graph represents the height of an air-filled ball thrown in a swimming pool.



a) What does the *y*-intercept represent?

starting height

b) What does the x-intercept represent?

when it hits water - pool surface

c) When does the ball reach the minimum height, what part of the graph is the min?

3 seconds vertex

d) What is the minimum height?

-4 ft

e) Estimate the time (in seconds) when the ball has a height of -2 feet, Is it an x or y value, how do you know? 4.5 sec

≈1.6 seconds time = x value

f) Estimate the height of the ball at 0.5 seconds, Is it an x or y value, how do you know?

≈ 2 feet height = y value

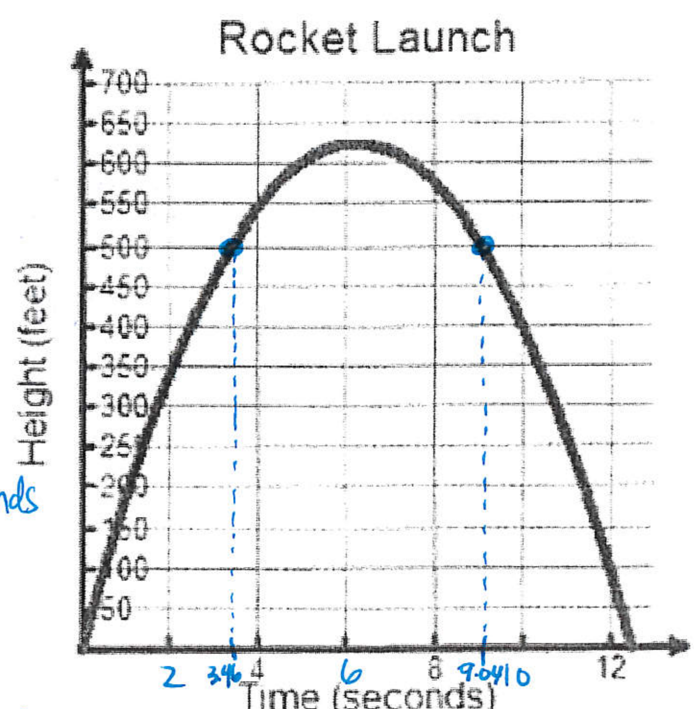
g) What is a **realistic** domain for the graph?

time [0,5] seconds

h) What is a **realistic** range for the graph?

height [-4, 5] feet

2. The graph $h(t)$ represents the height of a rocket shot up into the sky. The equation is $h(t) = -16t^2 + 200t$



a) Describe the meaning of the domain for *h*(t). What is a realistic domain?

[0, 13] seconds to launch & land

b) Describe the meaning of the range for *h*(t). What is a realistic range?

[0, 650] height from launch to land

c) What is the y-intercept and what does it represent?

(0,0) starting height

d) What are the x-intercepts and what do they represent?

(0,0) starts on ground at 0 sec

(0,12.5) lands on ground after 12.5 seconds

e) Use the equation to find the exact maximum height. 625 ft at 6.25 seconds

f) How long was the rocket above 500 ft?

≈ 5.58 seconds $500 = -16t^2 + 200t$

$0 = -16t^2 + 200t - 500$

g) How high is the rocket at 8 seconds?

$h(8) = 576$ ft

$\frac{-200 \pm \sqrt{(200)^2 - 4(-16)(-500)}}{2(-16)} = \frac{-200 \pm \sqrt{8000}}{-32} = 3.46 \text{ \& } 9.04$

between 3.46 & 9.04 seconds ≈ 5.58 seconds

Applications of Quadratic Functions Activity

Name: ______________________ Hr:____

Directions: You will rotate through 4 stations. On the catapult stations, you must do the following:

1. Launch balls from the catapult.
2. Each catapult must have a different starting height.
3. Each ball must land on the poster.
4. Each person in the group will take turns launching balls, measuring starting height, measuring maximum height or an intermediate point, and recording the data.

Materials Needed: Catapults, Tape measure, Worksheets, 6 Foot Chart

Station 1: (Catapult #1)

a. Height of starting point: ______________

b. Distance from launch to Chart: ___________

c. Vertex (Ordered Pair): _____________

d. Horizontal distance the ball traveled: ________

e. Graph (Make sure to label the axes and scale):

f. Write a quadratic equation to model the motion of the ball:________________________

Station 2: (Use the graph to answer the following questions)

a. Realistic Domain [0, 1.25]

b. Realistic Range [0, 9]

c. $h(0)$ 5

d. When does the tennis ball reach its maximum height? 0.5 seconds

e. What is the maximum height of the tennis ball? 9 ft

f. $h(1)$ 5

g. What does h(0.2) represent? height at 0.2 seconds

h. What does the y-intercept represent? starting height of ball

i. What does the x-intercept represent? Time it took to land.

Station 3: (Rocket)

a. Height of starting point: ______________

b. Distance from launch to landing spot: ___________

c. Vertex (Ordered Pair): _____________

d. Horizontal distance the rocket traveled: ________

e. Graph (Make sure to label the axes and scale):

f. Write a quadratic equation to model the motion of the rocket:_________________