Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Algebra II/Period \_\_\_\_\_

**Quadratic Real World Applications**

1. A baseball player throws a baseball during a recent game. The baseball is released 6 feet above the ground. Use the model *h*(t) = -5(t – 3)2 + 51 where *h*(t) is the height (in feet) and  is the time (in seconds) to answer the questions below.The graph of the equation is sketched below.



(\_\_\_\_, \_\_\_\_)



(\_\_\_\_, \_\_\_\_)

***Time***

***(sec)***

* 1. What is the y-intercept? \_\_\_\_\_\_\_\_\_\_\_\_
  2. Describe what the y-intercept of this problem means:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. What is the vertex? \_\_\_\_\_\_\_\_\_\_\_\_\_
  2. Describes what the vertex of this problem means:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. What is a reasonable domain for the situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. What is a reasonable range for the situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. The baseball player throws the ball again. This time, he stepped forward 3 feet and the ball reached a height of 56 feet. How is this change reflected in the equation of the ball’s path?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The Brick Oven Bakery sells more loaves of bread when it reduces its price, but then it profits change. The function  models the bakery’s profits, in dollars, where  is the price of a loaf of bread in dollars.

(\_\_\_\_\_, \_\_\_\_\_)

(\_\_\_\_, \_\_\_\_)

(1.25, 275)

P



* 1. What price should the bakery charge to maximize its profit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. What is the maximum profit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. Locate point P on the graph. Interpret the meaning of this point:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. What is a reasonable domain for the situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. What is a reasonable range for the situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. After the bakery looked at the financial statements, they realized the most profit was made when the cost of a loaf of bread is $2.50. When the loaves of bread were $2.50 a piece, the profit was $400. How does this change the profit function?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. A duck dives under water to catch a fish that is at a depth of 8 feet. The dive takes 4 seconds to reach the fish. The model of the dive can be found by using the function f(x) = ½(x – 0 )(x – 8) where f(x) represents the depth of the duck in feet at x seconds. Use this model to answer the questions below.

Sketch the graph on the provided grid:



* 1. What are the roots of the function? \_\_\_\_\_\_\_\_\_\_\_\_
  2. Describe what the roots of this problem mean:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. What is the vertex? \_\_\_\_\_\_\_\_\_\_\_\_\_
  2. Describes what the vertex of this problem means: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. What is a reasonable domain for the situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. What is a reasonable range for the situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  5. If the duck was at the surface of the water at 2 seconds and 10 seconds, how would this change the model of the function provided?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* 1. How does the change the vertex of the parabola? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A skating rink manager finds that revenue  based on an hourly fee  for skating is represented by the function .
   1. What window did you use to view the graph?

Sketch the graph below. Label the axes, solution, vertex and y-intercept.



* 1. What hourly fee will produce maximum revenue? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. What is the maximum revenue? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. What is a reasonable domain for the situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. What is a reasonable range for the situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  5. The skating rink made some changes and had new expenses. They found the maximum profit, which was $200 less than before, came when the hourly fee increased by $0.75. How does the function change?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. What would the vertex of the parabola be after the change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. What is the meaning of the new vertex? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_