Math 112 Written Homework: Quadratic Functions

Student Name:_____
Instructor: Laird
Math 112 Section: 062

<u>Directions</u>: Show all work, and answer each question that is asked. Explanations should be given in complete sentences. All graphs should be drawn accurately on this sheet, and be fully labeled.

1. A motorcycle stunt rider jumped across the Snake River. The path of his motorcycle was given approximately by the function $H(t) = -0.0005x^2 + 2.39x + 600$, where H is measured in feet above the river and x is the horizontal distance from his launch ramp.

   Define the variables:

   x :

   H :

   How high above the river was the launch ramp?

   How far was the rider from the ramp when he reached the maximum height?

   What was the rider's maximum height above the river?

2. A movie theater estimates that for each $0.50 increase in ticket price, the number of tickets sold decreases by 60. The current ticket price of $16.50 yields 1800 tickets sold.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Set up an equation to represent the daily revenue.

   What price should the theater charge for tickets in order to maximize daily revenue?

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3. Based on market data, a shoe company estimates that the relationship between the price, p, of a pair of basketball shoes, and the quantity sold, x, can be given by the equation $p = -\frac{1}{50}x + 110$.

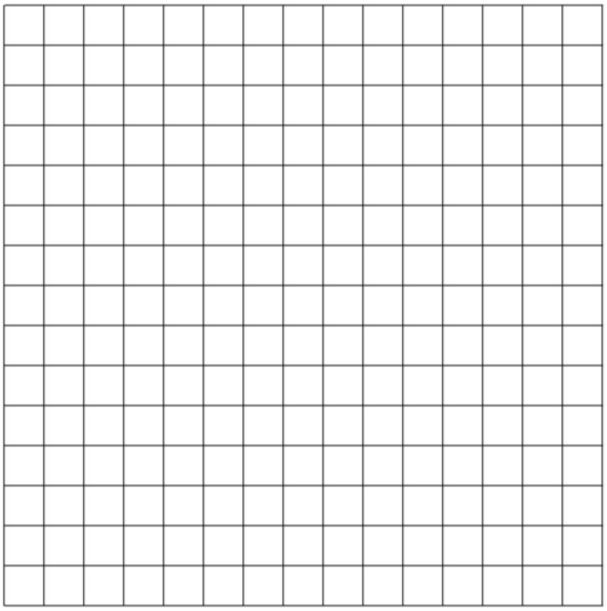
   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Create a function to represent the revenue generated by selling pairs of these shoes.

   Graph the function, labeling axes and scale.



   How many pairs of shoes should be sold in order to maximize revenue?

   What price should the company charge for the shoes in order to maximize revenue?

4. A company has determined that the demand function for a certain couch is given by $p = 2700 - 0.75x$, where p is the price per couch, and x is the number of couches sold. The fixed costs associated with producing a line of couches is \$760,000, and each couch costs \$360 to make.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Determine how many couches should be manufactured and sold in order to maximize profit. (Start by finding functions to represent the revenue and the total cost, then find a function for profit.)