Math 112 Written Homework: Quadratic Functions

Name: _____

Instructor: Taryn Laird

Math 112 Section: 006

<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 $H(t) = -0.0004x^2 + 2.59x + 500$, where H is measured in feet above the river and x is the horizontal distance from his launch ramp.

   How high above the river was the launch ramp?

   What was the rider's maximum height above the river, and how far was the rider from the ramp when he reached the maximum height? (Round answers to two decimal places if needed).

Name: _____
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2. A company that sells cameras has determined that the revenue generated by selling x cameras weekly can be modeled by the function $R(x) = 300x - 0.3x^2$, and the total cost associated with producing these cameras is given by $C(x) = 1000 + 150x$.

   Find a function to represent the profit from producing and selling x cameras.

   Use this function to determine the number of cameras that should be sold in order to maximize profit, and the maximum possible profit.

Name: _____
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Math 112 Section: 006

3. A guitar rental company estimates that for each $5 increase in monthly rental price, the number of guitars rented decreases by 1. The current rental price of $80 per month yields 30 guitars rented.

   Set up an equation to represent the monthly revenue.

   What price should the guitar rental company charge in order to maximize monthly revenue?

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4. A company has determined that the demand function for a certain couch is given by $p = 3000 - 0.5x$, 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 $700,000, and each couch costs $320 to make.

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