MATH 422 Week 5 Quiz Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

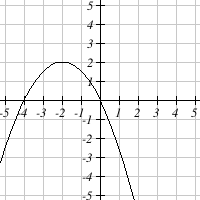
Fall 2023 Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Directions:**  Answer each question to the best of your ability. Show your reasoning and/or process used to answer the question(s) where it is appropriate. Standard form of a quadratic function is

and vertex form is and the

vertex of a parabola is which is also the turning point. If an equation is in standard form, the vertex can be found by: or we can get them from the graph.

**1. (3 pts)**

Write an equation (any form) for the quadratic function seen graphed below, where   
   
  
  Equation of the quadratic: y = f(x) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2. (3 pts)**

Let the demand function for a product be given by the function , where is the quantity of items in demand and is the price per item, in dollars, that can be charged when units are sold. Suppose . If x items are produced and sold, find the following:

R(x) = (where R is revenue)

Profit = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (where Profit = Revenue – Cost)  
  
The total profits to produce and sell items (to the nearest penny. Profits may or may not be negative.).  
Answer: $

If ***profits are $0*** when x = 12 and when x = 335, what would x need to be to maximize profit?

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**3. (3 pts)**

|  |  |
| --- | --- |
| x | y |
| 0 |  |
|  | 16 |
| 2 |  |
| 3 |  |
| 4 |  |

Consider the parabola given by the equation:   
  
Find the following for this parabola:  
  
A) The **vertex**:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B) Fill in the missing coordinates in the table of ordered pairs:

C) What is the **y-intercept**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
 

If necessary please round your value(s) to two decimal places.

**4. (3 pts)**

Put the equation into the form :  
  
Answer: =  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**5. (3 pts) (Multiple Choice)** Please circle or select from options A, B, C or D  
  
A company's profit when it sells *x* thousand items is predicted to be , which is a quadratic function.  
  
a) What is the company's cost to produce or sell nothing?  
  
To answer this question, we'd find:

1. The *x* intercept(s)
2. P(0)
3. The *x* coordinate of the vertex
4. The *P (or y)* coordinate of the vertex

b) **How many items** should the company sell to **maximize profit**?  
  
To answer this question, we'd find:

1. The *x* intercept(s)
2. P(0)
3. The *x* coordinate of the vertex
4. The *P (or y)* coordinate of the vertex

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**Key - Form 1**

1. 8748 ~ 3864 ~ 4884
2. ~ ~
3. B: The *P* intercept ~ A: The *x* intercept ~ C: The *x* coordinate of the vertex
4. B: The *h* intercept ~ D: The *h* coordinate of the vertex ~ A: The *t* intercept
5. 3 ~ 59 ~ 56.7402157264
6. 22 ~ 22
7. 14000
8. ~ 190 ~ 100
9. 6.08
10. 3.4 ~ 66
11. 22 ~ 193.6

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