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

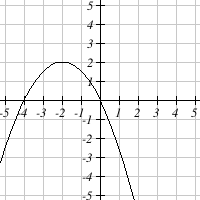
Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**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 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 fixed costs of production for this item are and variable costs are per item produced. If q items are produced and sold, find the following:

R(q) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (where R is revenue)

C(q) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (where C is cost)

Profit = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (where Profit = Revenue – Cost and is a function of q)  
  
A) The total revenue from selling items (to the nearest penny).  
Answer: $   
  
B) The total costs to produce items (to the nearest penny).  
Answer: $   
  
C) The total profits to produce items (to the nearest penny. Profits may or may not be negative.).  
Answer: $

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3. (3 pts)

|  |  |
| --- | --- |
| x | y |
| 0 |  |
|  | 11 |
| 1 |  |

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**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
 

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

4. (3 pts)

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

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5. (3 pts) (Multiple Choice) Please circle or select from options A, B, C or D

This question is not about solving the stated problem, but about understanding it.  
  
A company's profit when it sells *x* thousand items is predicted to be .  
  
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 does the company need to sell to **break even**?  
  
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

c) **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

+++++++++++++++

**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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