



2.6.6 Test (TS): Quadratic Functions

Precalculus Sem 1 (S4060907)

Points possible: 100

Test

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Date: _____

Answer the following questions using what you've learned from this unit. Write your responses in the space provided.

For questions 1 and 2, you will convert a quadratic function from one form to another.

1. Convert the following function into standard form, $y = ax^2 + bx + c$. **(4 points)**

$$y = 2(x - 5)(x + 2)$$

Part I: Use the FOIL method to multiply $(x - 5)(x + 2)$. **(4 points)**

F:

O:

I:

L:

Now combine like terms to produce a quadratic trinomial.

Part II: Take your answer from part I and distribute the 2 through the entire expression to produce your final answer. **(4 points)**

2. Convert the following function into standard form, $y = ax^2 + bx + c$.

$$y - 3 = -2(x + 1)^2$$

Part I: Simplify the quadratic term by squaring the $(x + 1)$ term. **(4 points)**

Part II: Simplify the expression $-2(x + 1)^2$ by distributing the -2 through your answer to part I. **(2 points)**

Part III: Solve the original equation for y . **(2 points)**

3. Solve by factoring: $x^2 - 5x - 36 = 0$.

Part I: Using the sign of the constant term, determine whether your two factors will have (choose one):
(2 points)

A. Two positive numbers **B.** Two negative numbers **C.** One positive number and one negative number

Part II: List all the positive factor pairs of 36. **(2 points)**

Part III: The sum of your two factors must be -5. Which of your factor pairs above could produce this sum? **(2 points)**

Part IV: Place your factors in the proper spots so that your answer will produce the original problem. **(2 points)**

Part V: Use the zero product property to solve the equation. **(2 points)**

4. Solve using the quadratic formula: $x^2 - 4x + 1 = 0$.

Part I: What are the values of a , b , and c in this quadratic equation? **(2 points)**

Part II: Write out the quadratic formula using your values from part I to solve this equation. Do not write your answer as a decimal. Instead, leave radicals in your answer. **(4 points)**

5. Use the quadratic formula to solve: $3x^2 + 4x + 2 = 0$.

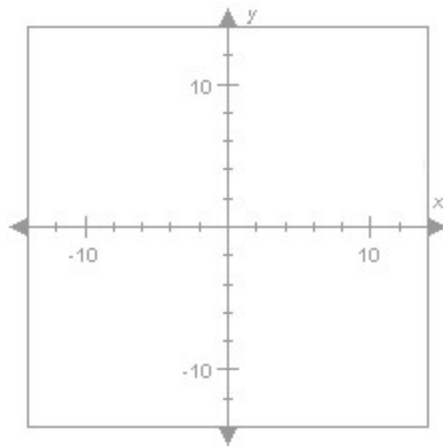
Part I: What are the values of a , b , and c in this quadratic equation? **(2 points)**

Part II: Write out the quadratic formula using your values from part I to solve this equation. Write your answer as a complex number using the notation $a \pm bi$. **(4 points)**

6. $y - 3 = 2(x - 1)^2$

Part I: For the graph of the function above, what are the coordinates of the vertex? **(4 points)**

Plot this point on the graph below.



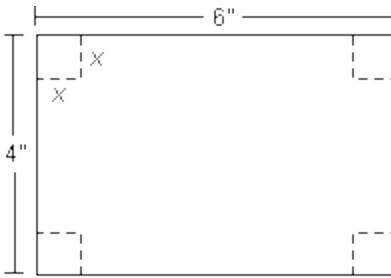
Part II: Substitute $x = 0$ into the function to find the value of the y-intercept. **(4 points)**

Plot this point on the graph above.

Part III: Does the graph of this function have any x-intercepts? If so, find them. If not, explain how you know. **(4 points)**

Part IV: Complete the sketch of this graph from the points you've already plotted. **(4 points)**

7. A box is to be formed by cutting square pieces out of the corner of a rectangular piece of a 4" by 6" note card as shown below. The sides will then be folded up to make the box.



Part I: (6 points)

- A. What is the original length (long side) of the note card?

- B. How many pieces of length x have been cut from the original length?

- C. Write the resulting length of the note card, once the pieces have been cut.

- D. What is the original width (short side) of the note card?

- E. How many pieces of length x have been cut from the original width?

- F. Write the resulting width of the note card once the pieces have been cut.

Part II: (8 points)

- A. Use your answers to parts c and f to express the new dimensions of the box.

- B. The area of the bottom of the box is the product of the new length and width. Write this area as a function in the form: $A(x) =$ your answer

Part III: (8 points)

A. Assume you want the bottom of your box to cover a total area of 16 in^2 . Set your question from part II equal to 16 and use the quadratic formula to solve for the two possible answers.

B. One of these answers is not possible due to the original dimensions of the note card. Clearly indicate which answer is not possible, and circle your final correct answer.

8. Use the function $y = x^2 - 5x - 14$ to answer the following questions.

Part I: What is the y-intercept of this function? Express your answer in the form (x,y) . **(4 points)**

Part II: Use the formula for finding the x -coordinate of the vertex to solve for both coordinates of the vertex. Express your answer in the form (x,y) . **(4 points)**

Part III: Factor the function to find the coordinates of the x -intercepts of the function's graph. Express your answer in the form (x,y) . **(4 points)**

9. Use the function $y = 2x^2 + 3x - 7$ to answer the following questions.

Part I: What is the y -intercept of this function? Express your answer in the form (x,y) . **(4 points)**

Part II: Use the formula for finding the x -coordinate of the vertex to solve for both coordinates of the vertex. Express your answer in the form (x,y) . **(4 points)**

Part III: Use the quadratic formula to find the coordinates of the x -intercepts of the function's graph. Round your answers to the nearest hundredth. Express your answer in the form (x,y) .(4 points)