

Algebra

Quadratic Equations

Project

Name _____

Period _____

Due Date: _____

QUADRATIC EQUATIONS PROJECT

Parabolas All Around Us:

Each of you has been given your own unique quadratic equation to work with for this project. You are not allowed to use a different quadratic equation than the one you have been assigned. For this project, you will be creating a poster that goes through the step-by-step procedure needed to draw the graph of a quadratic equation. You will also be looking for real-life examples of parabolas.

Using your quadratic equation, you must complete the following tasks and place the information on a poster board.

NOTE: Before creating your poster, you must find the basic information about the graph of your quadratic equation.

1. Information for poster
 - a. Does the parabola open upward or downward? How can this be determined from the equation?
 - b. What is the axis of symmetry? Find this algebraically. ($x = \frac{-b}{2a}$)
 - c. What are the coordinates of the vertex? Is this vertex a maximum or minimum? How do you know? Find the vertex algebraically. (Substitute the axis of symmetry value into the original equation for x.)
 - d. What is the y-intercept? Find this value algebraically. (Substitute zero for x.)
 - e. What are the roots/zeros/x-intercepts of your parabola?
 - i. Solve by factoring
 - ii. Solve by quadratic formula
 - iii. Solve by completing the square
 - f. Graph the parabola on graph paper.
2. Find an example of a parabola in the real world. Print out a picture of this item and list two facts about the item including where the item is located.
3. Create your poster board
 - a. Write the equation that you have been given at the top of your poster board.
 - b. Direction of Opening Section: You need a statement such as "The parabola for this equation opens _____ because _____."
 - c. Axis of Symmetry Section: You must include all of the work you did and have a statement that says "The axis of symmetry is _____."
 - d. Vertex Section: You must include all of the work you did in order to find the vertex, as well as a statement that says "The vertex is located at (____, ____)."
 - e. Y-intercept Section: You must include the work shown to find the y-intercept and include a statement that says "The y-intercept for this equation is (____, ____)."
 - f. Roots/Zeros/X-intercept Sections: You must find the roots of the function in three ways, by factoring, by using the quadratic formula and by completing the square. Also include a statement that says "The roots of this quadratic equation are $x = \underline{\hspace{1cm}}$ and $x = \underline{\hspace{1cm}}$."

- g. Graph: The graph of the parabola must be drawn on graph paper. The graph must indicate the scale that is being used. Label the x and y axis, vertex, axis of symmetry, roots and y-intercept.
- h. Real Life Example: Find an example of a parabola in real life. Place a picture of it on your board and include where the item is located and write two interesting facts about it.
- i. Please write your name on the back of your poster board.

You will have one opportunity in class to begin working on your project. You must complete the rest of the project on your own. You must work independently. This project is to test your understanding of quadratic equations. A rubric has been attached for your convenience.

RUBRIC

Part I: Poster Board/Accuracy

Description of Task	Possible Points	Points Earned
The problem is written on the top of the poster board.	2 points	
DIRECTION OF OPENING SECTION: The statement "The parabola for this equation opens _____ because ____" is included.	4 points	
AXIS OF SYMMETRY SECTION: <ul style="list-style-type: none"> • The formula for the axis of symmetry is included. • The work needed to find the axis of symmetry is included. • Work is accurate • The statement "The axis of symmetry is ____" is included. 	10 points	
VERTEX SECTION: <ul style="list-style-type: none"> • The work needed to find the vertex is included. • The statement "The vertex is located at (__, __)" is included. • Work is accurate 	10 points	
Y-INTERCEPT SECTION: <ul style="list-style-type: none"> • A description of how to find the y-intercept given the equation is included. • Work is accurate and shown. • The statement "The y-intercept for this equation is (__, __)" is included. 	4 points	
X-INTERCEPT SECTION: <ul style="list-style-type: none"> • The x-intercepts are found by factoring (label factoring method, then show work). • The x-intercepts are found using the quadratic formula (label quadratic formula, then show work). • The x-intercepts are found by completing the square (label completing the square method then show work). • The statement "The roots of this quadratic equation are $x = \underline{\hspace{1cm}}$ and $x = \underline{\hspace{1cm}}$." 	20 points	
GRAPH SECTION: <ul style="list-style-type: none"> • The graph is drawn on graph paper and included on the poster board. • The x and y axis, vertex, axis of symmetry, roots and y-intercept are clearly labeled on the graph. 	20 points	
REAL LIFE EXAMPLE SECTION: <ul style="list-style-type: none"> • Picture of a real life parabola is on the board along with its location and two facts about the parabola is included 	10 points	
Part I Total Points	80 points	/80

Part II: ORGANIZATION

Description of Task	Possible Points	Points Earned
The poster is neat and legible with each section clearly labeled. Name of the back of poster board.	20 points	
TOTAL PROJECT POINTS (Parts I and II)	100 points	/100