QUADRATIC EQUATION PROJECT

INTRODUCTION

For this project, a poster or brochure will be created that explains different characteristics of quadratic functions, the various methods that can be used to solve them, the steps to graph a quadratic equation, as well as an example of parabolas in the real world.

REQUIRMENTS

The project will contain 4 parts. Each section must be titled.

#1 Characteristics of a Quadratic

points

Choose ONE quadratic functions for this section, write the function in function notation write a paragraph describing the characteristics of the function.

- □ Direction of Parabola

  A statement that says, "…parabola for this equation opens_____ because _____. "

- □ Maximum or Minimum Value

  A statement that says, "…parabola has a _____ because _____. "

- □ Vertex and Axis of Symmetry

  Show work on how coordinates were found and a statement that says, "…the vertex of the parabola is _____ and the equation for the axis of symmetry is _____. "

- □ Y-Intercept

  Show work on how to find the y-intercept and a statement that says, "…the y-intercept for this function is _____."

- □ Roots/Zeros/X-intercepts/Solutions

  Describe what the solutions are for a quadratic function, how many solutions the function will have and explain why. To verify the solutions, show the roots on the graph and use one additional method to solve for the solutions.

- □ Additional Points

  Show work to find 3 additional points on the parabola. One point must be found by explaining the symmetry of the parabola.

- □ Graph

  The graph of the parabola must be drawn on graph paper. Label the vertex, the axis of symmetry, and the y-intercept.

#2 Methods to Solve a Quadratic Equation

points

Choose ONE of the listed functions for this section and solve using 4 methods. Show ALL steps and box or highlight answers.

- □ Factoring
- □ Completing the Square
- □ Using the Quadratic Formula

□ Graphing

#3 Graphing a Quadratic Function

Choose ONE quadratic function for this section and graph the function using both methods. This section will contain 2 separate graphs. Graphs must be on a printed graph or graph paper.

From Standard Form:
- □ Create a table of values with at least 5 points
- □ Graph and label axis of symmetry as dotted or highlighted line
- □ Graph quadratic function

From Vertex Form:
- □ Show steps to convert equation from standard to vertex form
- □ Use complete sentences to describe the transformation from the parent function
- □ Graph the function on graph paper, label, and highlight (in different colors) both the parent function and transformed function.

#4 Parabolas in the Real World

For this section, an example of a parabola in the real world will be examined. Use a magazine or internet picture, take a photograph (2.5% bonus, Ayala bulldog must be in corner of image) or use an image available from teacher.

- □ Include actual picture of the parabola
- □ Trace parabola onto transparency
- □ Draw x- and y-axis on graph paper and attach traced parabola
- □ Locate vertex and roots from graph

> **HINT:** it would be helpful to place the vertex and roots as integer coordinates if possible. …need help…?

- □ Write the equation of the parabola in vertex form and convert to standard form
- □ Choose an x-value to the right and to the left of the vertex (not symmetrical points, but in the domain of the graphed portion of your function) and use the equation to find 2 points of function
- □ Plot calculated points on transparency
- □ Explain why (or why not) the points were on (or not on) your graphed function and what this could mean about the structure or your function.

PREPARATION

A rough draft must be submitted and signed off by teacher before you begin creating final product. Posters will be given a 2.5% bonus. Posters and/or Brochures must be organized, colorful, and neat. The rough draft and a copy of these instructions must be turned in with the final product.

Each of the following characteristics must be used somewhere in your project:

a parabola…
- □ with rational solutions
- □ with irrational solutions
- □ with 1 real solution
- □ with 2 real solutions
- □ with complex solutions
- □ that opens up
- □ that opens down

All Posters are due: _____

Total Possible Points: 50 POINTS

Names: _____ **Period:** _____

Parabola Rubric: Attach this paper to the back of your poster!!

Accuracy		
Direction of Opening: The statement "The parabola for this equation opens _____ because _____." is included.	**2 points**	
Axis of Symmetry: The formula for the AOS is included. The work needed to find the axis of symmetry is included. The statement, "The axis of symmetry is _____." is included.	**2 points**	
Vertex: the work needed to find the vertex is included. The statement, "The vertex is located at (__,__)." is included.	**2 points**	
Maximum/Minimum Value: A description of how to determine if the function has a maximum or minimum value is included. The statement, "The maximum/minimum value of this quadratic function is _____." is included.	**2 points**	
Y-Intercept Section: A description of how to find the y-intercept given the equation is included. The statement, "The y-intercept for this equation is (__,__) ." is included.	**2 points**	
X-Intercepts/Roots Section: The x-intercepts are found by factoring. The statement, "The roots of this quadratic equation are (__,__) and (__,__)," is included.	**6 points**	
Other Points: Three points on each side of the vertex are found through (1,1a), (2,4a), (3,9a)	**6 points**	
Graphing Section: The graph is drawn on graph paper and included on the poster.	**6 points**	
Your name is on the front or back of the poster.	**1 points**	
The poster is neat and legible, with each section clearly labeled.	**5 points**	
3 Real world pictures/sketches are included.	**6 points**	
Uses Quadratic Equation to solve (10 points Extra Credit)	**10 Points (EC)**	
Total Points	**40 points**	