1. Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_\_



**Quadratic Functions Project: Mathematics and the Arts**

1. Find an example of the graph of a quadratic function in a work of art or architecture. Print a copy of the picture of art/architecture.
2. Print the picture on graph paper. Draw the *x*- and *y*-axis over the picture of the work of art or architecture that you’ve chosen (you may need to enlarge the quadratic part of the artwork and then draw the coordinate axes.  If so, please include a copy of the original work of art or architecture as well.)  Mark the scale clearly.
3. Find and label the coordinates of **at least** five points on your graph.
   1. One of the points must be the vertex.
   2. Label the vertex, axis of symmetry, and *y*-intercept. Is the vertex the maximum or minimum?
   3. Label the *x*-intercept(s)
   4. Identify the domain and range
4. Take a picture of a parabola. You might find the parabola at home, in your neighborhood, on a trip, or even at school. Repeat steps 2 – 3 for your picture.
5. Present your results in a well written report and include this in a portfolio or neat, well organized poster.
   1. Make sure that your report includes at least 3 interesting facts related to your piece of artwork and a detailed description of the location of your personal photo. If the picture was taken at your house, please do **not** include your home address in your project
   2. Cite your sources.
   3. Bonus: Your report/poster can include information about the *actual* size of your artwork as well as the scale that was used in your copy of the picture. Include the scale on the pictures (for example, 1 cm = 325.2 feet)

Other information:

* This project is to be completed independently. No two students can use the same piece of artwork/architecture.
* WARNING!!! Some pictures may appear to be parabolas but may not actually be real parabolas. If your artwork is not a true parabola, but is close, you will discuss that in your report.
* If using a portfolio, please do **not** turn in a 3-ring binder.

**---------------------------------------------------------------------------------------------------------------------**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_**

**Project Idea Submission Form**

**(Detach this form and submit your project idea to your Algebra teacher by \_\_\_\_\_\_\_\_\_\_)**

**Piece of Artwork/Architecture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Source: (where did you find it? )\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_

**(Remember: Google.images is NOT a source; it is a search! Go to the source.)**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_**

**Project Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Use the following rubric as a “checklist” to help you as you complete your project. Please turn in this rubric with your final project. It will be used to score your project.

***Rubric:***

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Criteria** | **Points possible** | **Points earned** |
| 1 | Project Idea  *Idea was submitted and approved by due date.* | 5 |  |
| 2 | Art/architecture  *An original copy of the piece of parabola artwork was included (not printed on graph paper.) The source is cited under the picture.* | 8 |  |
| 3 | Art/architecture  *The coordinate axes were accurately* ***drawn*** *and labeled over a copy of the original piece of parabola artwork.* | 5 |  |
| 4 | Art/architecture  *At least 5 points were accurately labeled on the graph of the parabola. The vertex, intercepts, and axis of symmetry are identified and labeled correctly. The vertex is also labeled as a minimum or maximum. The domain and range are written in set notation.* | 20 |  |
| 5 | Personal Photo  *An original copy of the piece of parabola artwork was included (not printed on graph paper.) The location of the picture is labeled (typed) under the picture.* | 7 |  |
| 6 | Personal Photo  *The coordinate axes were accurately* ***drawn*** *and labeled over a copy of the photo.* | 5 |  |
| 7 | Personal photo  *At least 5 points were accurately labeled on the graph of the parabola. The vertex, intercepts, and axis of symmetry are identified and labeled correctly. The vertex is also labeled as a minimum or maximum. The domain and range are written in set notation.* | 20 |  |
| B | **BONUS:** *An accurate scale was included on both graphs, showing the relationship between the picture size and the* ***actual*** *size of the artwork/architecture.* | Bonus 5 |  |
| 9 | **IN Class**  *(For each graph) A quadratic Regression equation and correlation coefficient was found and labeled. A 6th point was labeled and tested in the regression equation.* | 10 |  |
| 10 | *Results were presented in a well written report and the project is displayed in a portfolio or neat, organized poster. Report included at least 3 interesting facts about the piece of artwork/architecture. Based on the correlation coefficient, if the parabola is not a perfect parabola, the error factor was discussed. A detailed description of the location of your personal photo was included (do not include home addresses.) All sources were cited.* | 20 |  |
|  | **Total** | **100** |  |

**Due Dates:**

Rubric category #1 due Friday, May 8

Rubric categories #2 – 7 due Wednesday, May 13

In class #9 will be Thursday, May 14, 2015

Completed Project, including #10 due Friday, May 22