

We see conic sections in our lives everyday and in the multiple careers that we hope to go into. Some of these careers include the fields of science, business, art and photography. As we continue to study conics, you will take on four different career roles in order to see how conic sections are relevant to these occupations in order to make decisions.

This project is due _____.

All work must be shown on scrap paper. Each response should be typed and all photos/drawings attached. Please separate all work for each category.

I. Introduction. Explain what conic sections are and make drawing or a three-dimensional model showing how a cone could be sliced to form each of the conic sections. Each section should be defined and labeled. Visual should be colorful and neat.

II. You are a Jeweler! You are a jeweler and you have a ring that you must resize for a customer. Suppose this ring has a diameter of 20 mm and has to be resized to fit a finger 16 mm in diameter.

- a) Write an equation of the ring, assuming it is centered at the origin.
- b) Write an equation of the ring once it has been resized to fit your customer's finger.
- c) Please **draw and label** the graph that represents this ring.

III. You are a Historian! Find a picture of Statuary Hall in the US Capitol in Washington DC. Answer the following question about Statuary Hall: Statuary Hall is an elliptical room in the U.S. Capitol in Washington, D.C. The room is also called the Whispering Gallery because a person standing at one focus of the room can hear even a whisper spoken by a person standing at the other focus. Statuary Hall is 46 feet wide and 97 feet long.

- a) Find an equation that models the shape of the room.
- b) Draw the graph of this equation and label it.
- b) How far apart are the two foci?
- c) What is the length of the major axis and the minor axis?
- d) What are the coordinates of the vertices?
- c) You are looking to hold a large even in Statuary Hall. In order to know how many people you can fit in the room, you must determine the area of it. How

would you find the area of the floor of the room? What is the area? (*Hint: You can do outside research if you are unsure!*)

IV. You are an astronomer! Comets have hyperbolic orbits. A specific comet follows a hyperbolic path about the *focus* of the Sun. The equation of the orbit is $\frac{x^2}{80^2} - \frac{y^2}{150^2} = 1$ where x and y are measured in gigameters.

- a) Please find a picture of the hyperbolic orbit of a comet.
- b) Using the equation above, please draw and label the graph of this orbit.
- c) Using the equation above, determine how far from the center of the hyperbola the sun is.

V. You are a photographer! You are looking to take photographs of parabolic shapes but you need to do some research first.

- a) Find a real life photo of a parabolic shape.
- b) Using what you know about parabolas, please find the equation to model the size of this real life parabola by placing it on a coordinate plane.
- c) Label the vertex and the focus so that you know the angle at which you must take your photos in order to create a perfect parabolic photograph.

Project Rubric

Name: _____

Date: _____

Grade: _____

Teacher: _____

	Criteria				Value
	1	2	3	4	
Problem Solving	Little or no understanding of the problem is evidenced.	Numerous errors when solving problems.	Few errors when solving problems.	No errors when solving problems.	---
Math Content	Demonstrates little or no knowledge or application of math skills.	Demonstrates a limited knowledge and application of math skills.	Demonstrates a general knowledge and application of math skills.	Demonstrates a clear knowledge and application of math skills.	---
Math Communication	Inaccurately communicates solutions to problems and concepts.	Limited communication of solutions to problems and concepts.	Satisfactorily communicates solutions to problems and concepts.	Accurately communicates solutions to problems and concepts.	---
Presentation	The reader is unable to follow the steps taken in the solution.	Solution is difficult to follow at times.	Solution is presented in a logical manner.	Solution is presented in an easy follow step-by-step model.	---
Use of Mathematical Terminology	No mathematical terminology is used or attempted.	Some mathematical terminology is presented, but not correctly used.	Mathematical terminology correctly used.	Mathematical terminology is prevalent and used correctly.	---
				Total:---	---

TEACHER COMMENTS