Conics Project

Create by hand an original work of art that can be represented by equations of lines and conic sections. The artwork must be in color.

Your picture MUST include at least the following:

1. Eleven (11) conics, to include a minimum of

 a. Three (3) ellipses

b. Three (3) circles

 c. Three (3) parabolas

 d. Two (2) additional conics – Parabolas, Circles, or Ellipses

2. Six (6) lines, at least 3 of which are neither vertical nor horizontal.

Your project must include the following:

**1. Technical version of picture.**

This is a detailed graph with each line and conic clearly labeled on graph paper (8.5” x 11”). Clearly identify and label the x and y axis.

1. Each conic and line must be numbered and the highlighted and color-coded by conic or line type. For example, circle numbers could be highlighted in blue, parabola numbers in yellow, etc. Do not include anything else on this paper.
2. The technical drawing must be neat, accurate, and easy to read.

**2. Mathematical Equations sheet(s):**

a. Your work needs to be organized in sections by conic or line type. Each equation needs to be numbered to match the number highlighted on the technical drawing.

b. Write the equations as shown and find the following:

 1. **Circle: center, radius, standard & general form**

 2. **Ellipse: center, vertices, co-vertices, foci, major & minor axis, standard & general form**

 3. **Parabola: vertex, focus, directrix, axis of symmetry, vertex & general form**

 4. **Line: slope, y- intercept, & x-intercept**

c. You must include the restricted domain or range (to nearest hundredth, if not an integer) for all functions, especially if you are only placing a portion of the conic or line in your drawing.

**3. Final Equation Sheet(s):**

All final work must be shown neatly, and in an organized manner. The final equation sheet will be typed out and submitted. All side work converting functions from standard (vertex) form to general form must be shown on the Mathematical sheet(s).

**4. Artistic rendering of picture.**

a. This is a tracing of the technical version, colored using the medium of choice. There are no labels, just the completed color picture.

b. Use 8.5” x 11” paper.

c. *Be creative in your coloring*.

This is worth 200 points. It is due at the beginning of the class period on Tuesday, May 29th, 2018. I will accept it early, but I will NOT accept it late.

Assignment Information
\_\_\_ On-Time \_\_\_ Late

 Grade \_\_\_\_\_\_\_

Letter Grade \_\_\_\_\_\_\_

**Conics Art Project Rubric**

*Please include this as the first page of your project packet*

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_ Date Turned In \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Accuracy of Mathematics** All equations are accurate and precise. Work shown neatly and organized. All domains/ranges correctly stated. Equations must match graphical representations. If they do not match, no credit for that equation/graph combination.Fully completed Final Equation sheet that matches the answers found on the Mathematics Equation sheet. | 65 points | \_\_\_\_\_\_\_\_ / 65 points |
| **Minimum requirements Met**:3 circles, 3 ellipses, 3 parabolas, 6 lines, 2 additional conics of your choosing.All sections included on equation sheet. If they do not match, no credit for that equation/graph combination.Final Equation sheet correctly and completely filled out for all conic and line types. | 65 points | \_\_\_\_\_\_\_\_\_ / 65 points |
| **Creativity**Colored and completed Original design | 30 points | \_\_\_\_\_\_\_\_\_ / 30 points |
| **Degree of Difficulty**Use of fractional units or decimals will increase the difficulty score. Integer units only will result in a 10/20.50% of equations need to include fractions or decimals. | 20 points | \_\_\_\_\_\_\_\_\_ / 20 points |
| **Neatness**Final work not wrinkled, folded, or messy. | 10 points | \_\_\_\_\_\_\_\_\_ / 10 points |
| **Class Ranking**Score based upon classmates awarding points | 10 points | \_\_\_\_\_\_\_\_\_ / 10 points |
| **Total Score** |  |  \_\_\_\_\_\_\_\_\_ / 200 points |

Items that will be submitted:

* Artistic Rendering of the Technical version
* Technical version, correctly labeled and color-coded
* Final equation sheet, typed out and organized by conic and line type
* Mathematics sheet, with all calculations for each conic and line type worked out

Sample Final Equation Sheet:

Parabola .

#1 #2

Standard Form: $y=3(x-2)^{2}-5$ Standard Form:

General Form: $y=3x^{2}-12x+7$ General Form:

Vertex: $(2,-5)$ Vertex:

Axis of Symmetry: $x=2$ Axis of Symmetry:

Focus: $(2,-17/4)$ Focus:

Directrix: $y=-23/4$ Directrix:

Domain : Domain :

Range : Range :

Circles .

#1 #2

Standard Form : $(x-3)^{2}+(y+4)^{2}=16$ Standard Form:

General Form :$x^{2}+y^{2}-6x+8y+9=0$ General Form:

Center : $(3,-4)$ Center :

Radius : $r=4$ Radius :

Domain : Domain :

Range : Range :

Ellipses .

#1 #2

Standard Form :$\frac{(x-4)^{2}}{16}+\frac{(y+3)^{2}}{25}=1$ Standard Form:

General Form : $25x^{2}+16y^{2}-200x+96y+144=0$ General Form:

Center : $(4,-3)$ Center:

Major Axis : 10 Major Axis:
Minor Axis : 8 Minor Axis:

Foci : $\left(4,-3\pm 3\right)=\left(4,0\right) , (4,-6)$ Foci:

Vertices :$\left(4,-3\pm 5\right)=\left(4,2\right) , (4,-8)$ Vertices:
Co-vertices : $\left(4\pm 4,-3\right)=\left(8,-3\right) , (0,-3)$ Co-vertices :

Domain : Domain :

Range : Range :

Lines .

#1 #2

General Form: $y=\frac{2}{3}x-6$ General Form:
Slope: $m=\frac{2}{3}$ Slope:

y-intercept: $(0,-6)$ y-intercept:

x-intercept: $(9,0)$ x-intercept:

Domain : Domain :

Range : Range :

\*Note: You will need 3-Parabolas, 3-Circles, 3-Ellipses, 2 additional conics (Circle, Ellipse, or Parabola), and 6 lines in total.