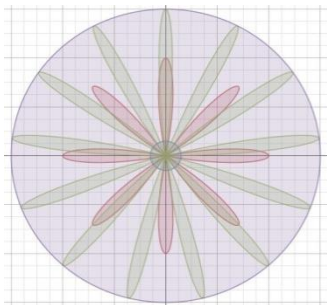


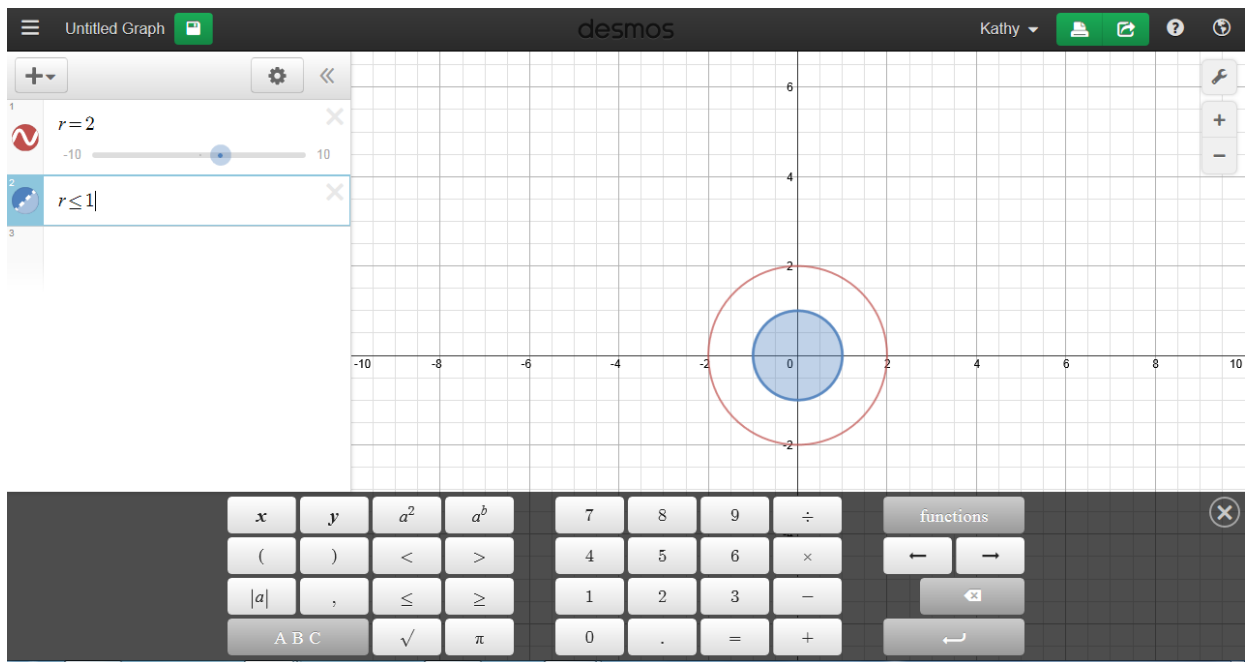
Project - Crazy Daisies

Name(s): _____

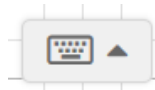


You will use polar equations of the form $r = a$, $r = a \sin(n\theta)$ and $r = a \cos(n\theta)$ to create some “crazy daisy” designs. The graph to the left was created with the Desmos free online graphing calculator: <https://www.desmos.com/calculator>. You can set up an account at this site and save your graphs.

1) Practice graphing some circles to become familiar with the graphing calculator. You can type in equations using your computer keyboard and the keypad within the calculator. Use the keypad letter palette (“ABC” key) for letters and θ or type out “theta” and the program will insert the symbol. Using an equation, “=”, will provide the graph of the curve. Use an inequality, “ \leq ”, to add shading to your graph. Please see the example below.



If the keypad is not visible click on the symbol:



When graphing $r = a \sin(n\theta)$ and $r = a \cos(n\theta)$ in the following parts, please note that using an equation, “=” versus an inequality, “ \leq ” will sometimes affect the number of petals in your daisy. Experiment and see the effects!

2) Graph a daisy with 5 petals. Each petal should be 3 units long and one petal should extend along the positive x-axis. The center of the daisy should be a circle of radius 0.5. Write the equations and/or inequalities you used to graph this daisy:

$$r = \underline{\hspace{10em}}; \quad r = \underline{\hspace{10em}}$$

3) Graph a daisy with 12 petals. Each petal should be 2 units long and one petal should extend along the positive y-axis. The center of the daisy should be a circle of radius 0.3. Write the equations and/or inequalities you used to graph this daisy:

$$r = \underline{\hspace{10em}}; \quad r = \underline{\hspace{10em}}$$

4) Graph a “double daisy”, a daisy within a daisy. The smaller daisy should have seven petals and each petal should be 2.5 units long. One petal should extend along the positive y-axis. The larger daisy should have sixteen petals and each petal should be 3.5 units long. The center of the double daisy should be a circle of radius 0.75. Write the equations and/or inequalities you used to graph this daisy:

$$r = \underline{\hspace{10em}}; \quad r = \underline{\hspace{10em}}; \quad r = \underline{\hspace{10em}}$$

5) Please answer the following questions for the equations $r = a \sin(n\theta)$ and $r = a \cos(n\theta)$. (Attach another sheet of paper with these answers).

- What effect does the parameter “ a ” have on the daisy? Be specific.
- What effect does the parameter “ n ” have on the daisy? Be specific and give some examples that have not already been used in this project.
- Using the same values of “ a ” and “ n ”, what is the difference between the graph of $r = a \sin(n\theta)$ and $r = a \cos(n\theta)$? Be specific.
- Why do you think using an inequality versus an equation can sometimes affect the number of petals?

6) Create your own “crazy daisy” using at least three overlapping daisies with different petal lengths and two different circles. Use a combination of equations and inequalities to create shading effects. Print out your graph and set of equations/inequalities and submit them with your responses to the other parts of this project.