

Form Meets Function II: Polar Graphing Project

Project Objective

You will create a unique design using the graphs of polar equations. Not only will your choice of equations determine your individual design, but also your choice of TI-83+ window settings.

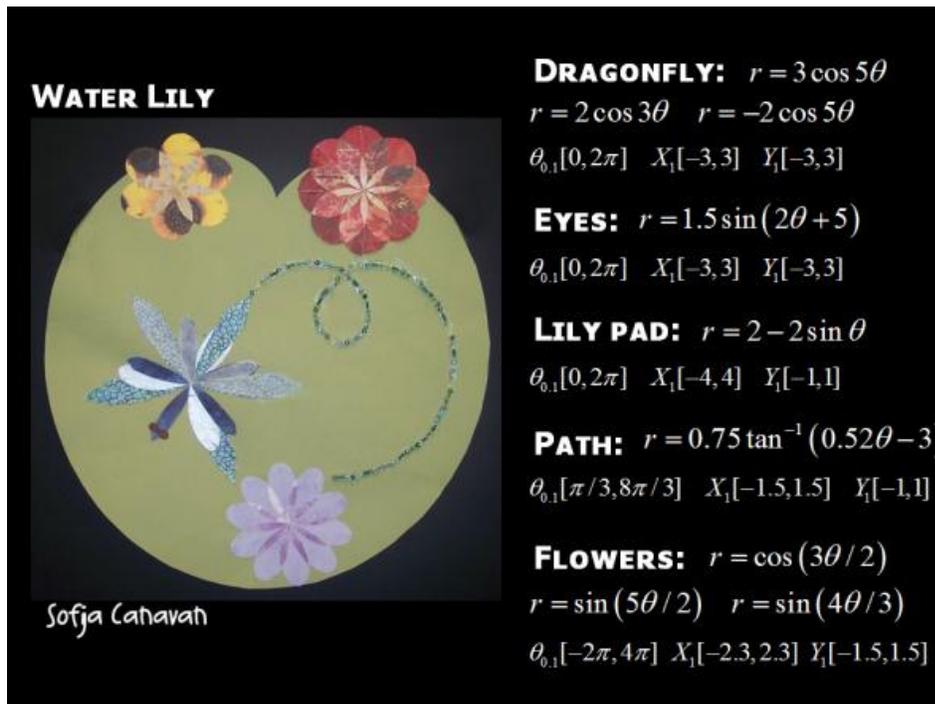
Criteria

Your design must:

- utilize at least two different polar equations
- be at least 18 inches tall by 18 inches wide
- incorporate 3-dimensional texture (example: string, beads, foil, papier-mâché)
- be accompanied by one or more note cards, clearly displaying the equations and TI-83+ window settings used to produce the graph

Grading

This project will be worth 75 points. It will be graded on three sets of criteria. 25 points will be based on the correctness of the equations and window settings, 25 points will be based on the creativity and visual appeal of the design, and the remaining 25 points will be awarded based on the thoughtfulness and thoroughness of your self-reflection.



Self-Reflection Questions:

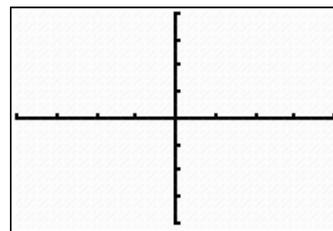
- In what ways did you experiment mathematically while working on this assignment?
- What did you learn from doing this assignment?
- Did you enjoy working on this assignment? Why or why not?

Graphing Polar Equations

1. Graph the following polar equation using the window settings provided:

Equation: $r = 2 + 2\cos\theta$

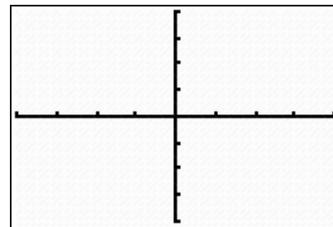
Window : $\theta_{\pi/12} [0, 2\pi]$ $X_1[-4, 4]$ $Y_1[-4, 4]$



2. Now change the θ -step to $\pi/4$ and describe the change in appearance that occurs. Why does the graph appear different?

Equation: $r = 2 + 2\cos\theta$

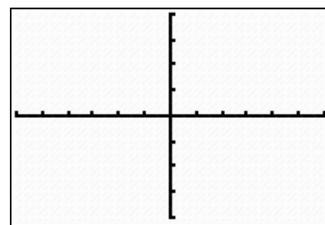
Window : $\theta_{\pi/4} [0, 2\pi]$ $X_1[-4, 4]$ $Y_1[-4, 4]$



3. Now change the minimum and maximum values displayed on the horizontal axis to -6 and 6, respectively. Describe the change in appearance that occurs. Why does the graph appear different?

Equation: $r = 2 + 2\cos\theta$

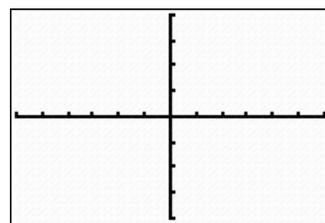
Window : $\theta_{\pi/4} [0, 2\pi]$ $X_1[-6, 6]$ $Y_1[-4, 4]$



4. The minimum and maximum values of θ also affect the display of the graph. Change the maximum value of θ to π . Describe the change in appearance that occurs. Why does the graph appear different?

Equation: $r = 2 + 2\cos\theta$

Window : $\theta_{\pi/4} [0, \pi]$ $X_1[-6, 6]$ $Y_1[-4, 4]$



5. Using a square window and a small θ -step will give the most accurate display of the graph. Change the θ -step to $\pi/24$ and the maximum value of θ to 2π .

Equation: $r = 2 + 2\cos\theta$

Window : $\theta_{\pi/24} [0, 2\pi]$ $X_1[-6, 6]$ $Y_1[-4, 4]$

