Computer Lab #2

(due December 5, 2018)

Important things to know for this assignment

- To enter θ, click on αβγ or α at the bottom of the window, then click on the θ.
- Here's how you can graph a polar curve:
  `r=3cos(4θ)` ← Graphs $r = 3\cos(4\theta)$

See Lab #1 for more directions.

In this lab, you'll get to explore some neat-looking polar curves.

Graphing Polar Curves

1. Graph each of the following polar curves. Here you don't need to show the commands that you used, just show the graphs. What do you think they look like?
   a. $r = e^{\sin\theta} - 2\cos 4\theta$
   b. $r = 2 + \sin 3\theta$
   c. $r = 1 + \cos^{888}\theta$
   d. $r = 4\cos\left(1.57 \cdot \left(\frac{1}{3}\right)^{\theta}\right)$ and $r = -4\cos\left(1.57 \cdot \left(\frac{1}{3}\right)^{\theta}\right)$

Adding Parameters to Polar Curves

Now let's add a parameter to a polar equation so we can see how the parameter affects the curve.

2. Follow the steps below.
   a. Create a slider a from 0 to 10 with increments of 0.1 by entering the following: `a:Slider(0,10,0.1)`
   b. Enter `r=3sqrt(cos(aθ))` and try moving the slider. Feel free to play around!
   c. Show what the graph looks like when $a = 2$. What does the curve look like?

Transformations with Polar Curves

Remember transformations? For example, in the equation $y = |x|$, if you replace x with $x - 3$ to get $y = |x - 3|$, the effect is to shift the graph in the positive x direction by 3 (that is, to the right by 3). Well, you can do the same thing using polar equations, but here you'll be replacing θ with $\theta - c$. What does this do to the graph? Follow the directions below and discover for yourself!

3. Follow the steps below.
   a. Create a slider c from 0 to 10 with increments of 0.1 by entering the following: `c:Slider(0,10,0.1)`
   b. Enter `r=2+sin(3(θ-c))` and try moving the slider. What happens to the graph when you move the slider? So, what does replacing θ with $\theta - c$ do to a graph?
   c. Show what the graph looks like when $c = 2.1$.