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DO NOW: Graphing Calculator Investigation

1. Put your calculator in radians and polar mode (both can be found under MODE), go to WINDOW and make sure  $\theta_{\text{Step}} = .1$
2. Go to  $y=$  and enter the following polar equations. Enter ZOOM TRIG and sketch each one.
3. Draw some conclusions:
  - a. What symmetry do the sine graphs have? What about the cosine graphs?
  - b. How can you predict the number of petals by looking at the equation?
  - c. How can you predict the length of the petals by looking at the equation.
  - d. How does a negative sign affect the graph?

$$r = \sin\theta$$

$$r = \cos\theta$$

$$r = \sin 3\theta$$

$$r = \cos 3\theta$$

$$r = -\sin 3\theta$$

$$r = -\cos 3\theta$$

$$r = 2\sin 3\theta$$

$$r = 2\cos 3\theta$$

$$r = 4\sin 5\theta$$

$$r = 4\cos 5\theta?$$

$$r = \sin 2\theta$$

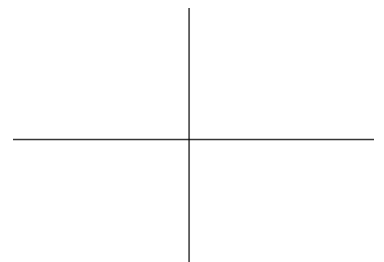
$$r = \cos 2\theta$$

$$r = 3\sin 4\theta$$

$$r = 3\cos 4\theta$$

Now, **NO CALCULATOR**, NO REFERENCE GRAPH. Quickly sketch.  
What will  $r = 3\cos 6\theta$  look like?

How many petals? How far apart are they? Where is the first one? How long are they?



### 11.1c Limaçons

$$r = a + b\sin\theta$$

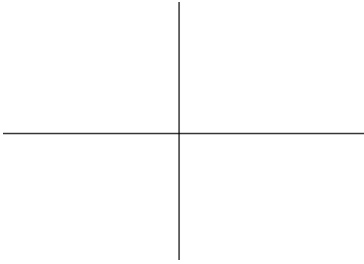
$$r = a + b\cos\theta$$

Graph the following wave graphs to be used as references for our polar graphs:

$$y = 2 + 2\cos\theta$$

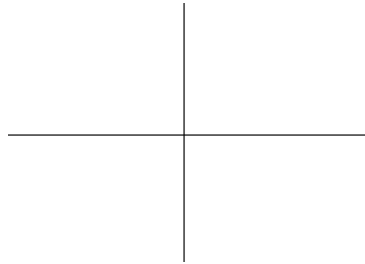
$$y = 1 + 2\cos\theta$$

$$y = 3 + 2\cos\theta$$

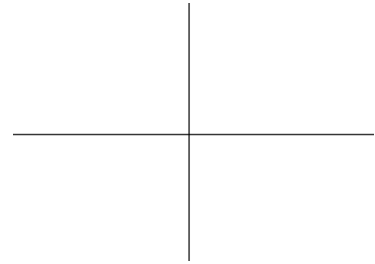


$$r = 2 + 2\cos\theta$$

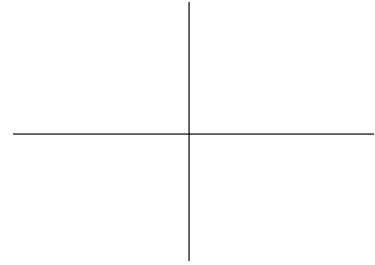
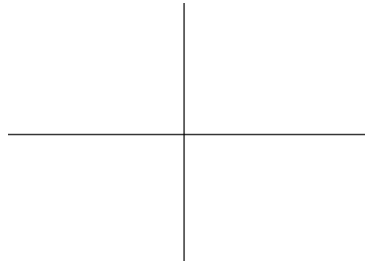
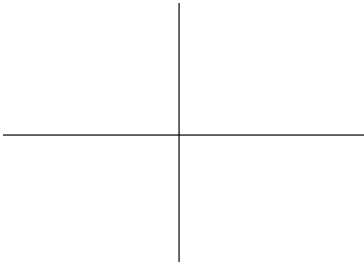
(special case: cardioid)



$$r = 1 + 2\cos\theta$$



$$r = 3 + 2\cos\theta$$



How do the equations relate to the graphs?

Graph  $r = 2 + 2\sin\theta$