

## PreAP Precal Polar Graph Investigation

Go to the site [goo.gl/kjnmzw](http://goo.gl/kjnmzw)

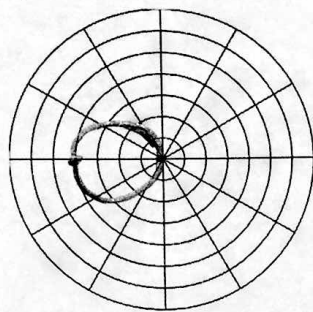
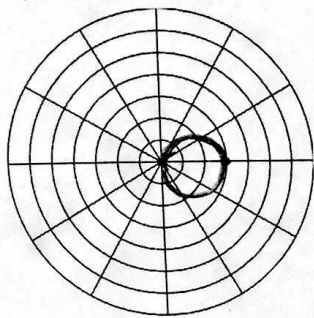
## Problem Set 1

The folder "problem set 1" should already been open, with the first graph turned on. Select the "play" button for slider  $a$  and watch. Turn on the second graph ( $r = a \sin \theta$ ) and watch some more. Pause the animation.

1) With only the first graph on, use the slider to graph the following and sketch.

a)  $r = 3 \cos \theta$

b)  $r = -4 \cos \theta$



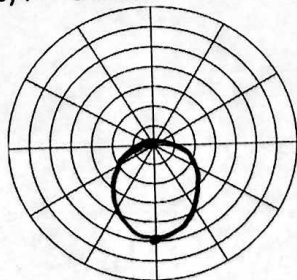
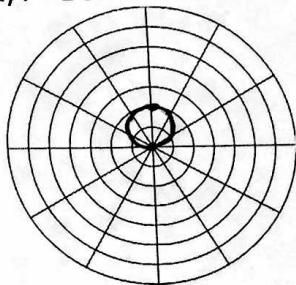
What do these graphs have in common? (things like general shape, axis of symmetry, distances, going through pole)

What was different about the graphs? How do these differences link to the equation?

2) With only the second graph turned on, use the sliders to graph & sketch:

a)  $r = 2 \sin \theta$

b)  $r = -5 \sin \theta$



How are these graphs different from the two graphs above? How do these differences link to the equations?

Key

You can also drag a slider to a specific value.

1	<input type="checkbox"/>	$a=1$	<input type="checkbox"/>
2	<input type="checkbox"/>	$b=1$	<input type="checkbox"/>
3	<input type="checkbox"/>	$n = -8.6$	<input type="checkbox"/>
4	<input checked="" type="checkbox"/>	Problem Set 1	<input type="checkbox"/>
5	<input checked="" type="checkbox"/>	$r = a \cos \theta$	<input type="checkbox"/>
6	<input type="checkbox"/>	$r = a \sin \theta$	<input type="checkbox"/>

Turn animation on/off

Open/Close folder

Turn folders or graphs on/off.

## PROBLEM SET 2

- Turn off (click the circle to the left of the folder) and close (click the arrow) the folder for Problem Set 1.
- Turn on (click the circle) and open the folder (click the arrow) for Problem Set 2.
- Set slider  $n$  to 4. Animate the  $a$  slider. Watch and notice. Pause slider  $a$ .
- Set slider  $a$  to 4. Animate the  $n$  slider. Watch and notice. Pause slider  $n$ .
- Turn off the first equation and turn on the second one. Repeat the previous two steps with sliders  $a$  and  $n$ .

Use the sliders to graph each equation and sketch (be sure to turn the graphs on/off as necessary)

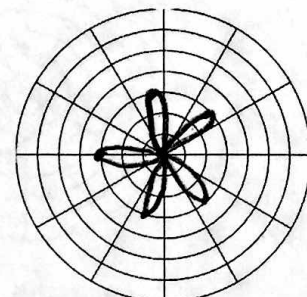
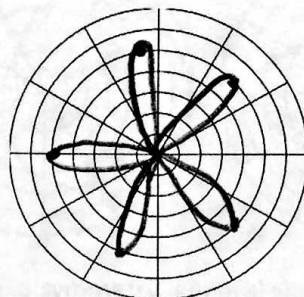
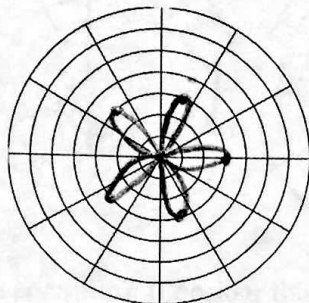
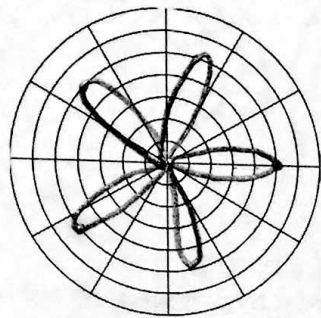
**Make sure you are using slider  $a$  for the first number and slider  $n$  (NOT  $b$ !) for the second number.**

a)  $r = 5 \cos 5\theta$

b)  $r = 3 \cos 5\theta$

c)  $r = -5 \cos 5\theta$

d)  $r = -3 \cos 5\theta$



What do these graphs have in common? (things like general shape, axis of symmetry, distances, going through pole)

What was different about the graphs? How do these differences link to the equation?

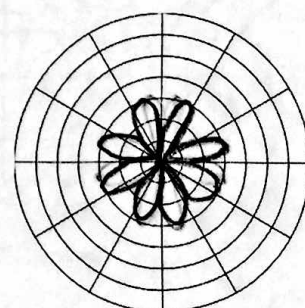
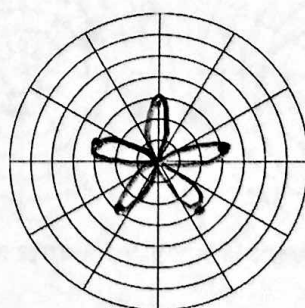
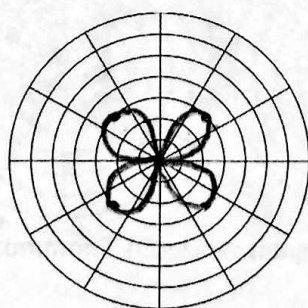
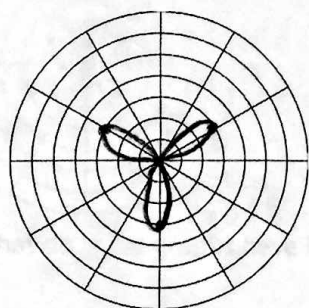
Graph & sketch each equation.

a)  $r = 3 \sin 3\theta$

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

c)  $r = 3 \sin 5\theta$

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



What do these graphs have in common? (things like general shape, axis of symmetry, distances, going through pole)

What was different about the graphs? How do these differences link to the equation?

**PROBLEM SET 3**

- Turn off and hide folder for Problem Set 2 and turn on and show folder Problem Set 3.
- Set slider a to 3. Animate slider b. Watch and notice. Pause slider b.
- Set slider b to 4. Animate slider a. Watch and notice. Pause slider a.
- Turn off the first graph and turn on the second one. Use the sliders to help you sketch the following.

**NOTE: We are most concerned about where the graph intersect the x/y axes, so be sure to draw those points!**

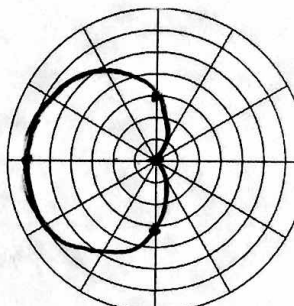
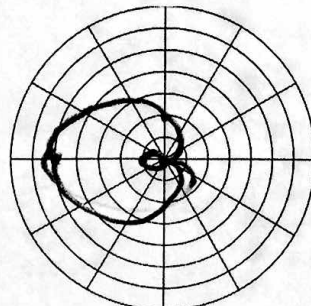
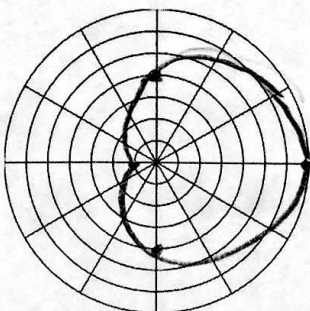
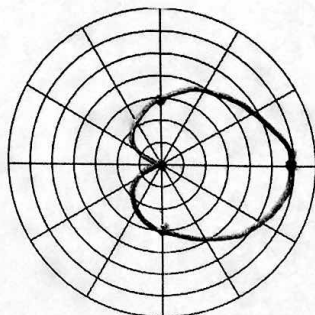
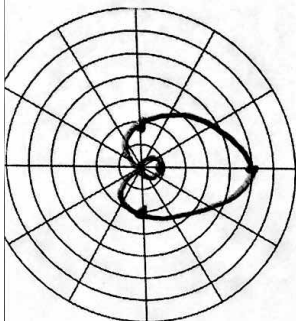
a)  $r = 2 + 3 \cos \theta$

b)  $r = 3 + 3 \cos \theta$

c)  $r = 4 + 3 \cos \theta$

d)  $r = 2 - 3 \cos \theta$

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



$r = a + b \cos \theta$

What do these graphs have in common? (Consider things like symmetry, general shape, distances)

What was different about the graphs? How did those differences link to the equation?

Switch to the sine graph and sketch the following.

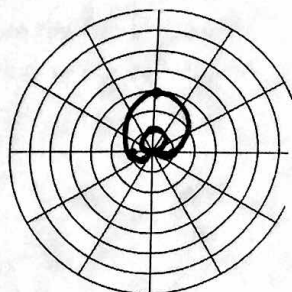
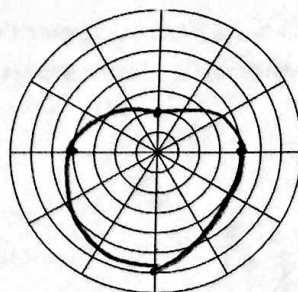
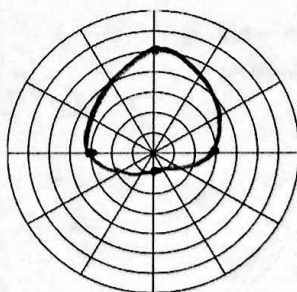
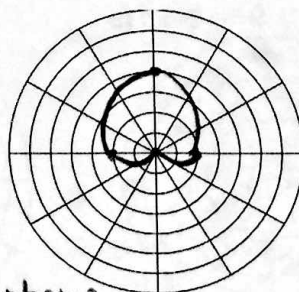
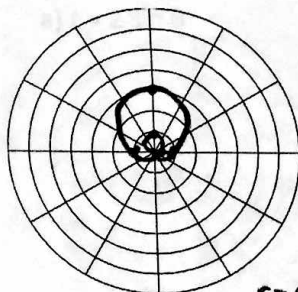
a)  $r = 1 + 2 \sin \theta$

b)  $r = 2 + 2 \sin \theta$

c)  $r = 3 + 2 \sin \theta$

d)  $r = -4 - 2 \sin \theta$

e)  $r = -1 + 2 \sin \theta$



$r = a + b \sin \theta$

What do these graphs have in common? (Consider things like symmetry, general shape, distances)

What was different about the graphs? How did those differences link to the equation?