

Name: _____

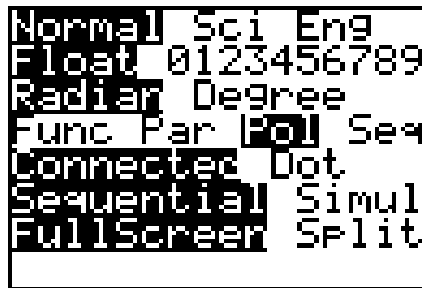
Date: _____

Investigation: Relationships Between Polar Rose Graphs

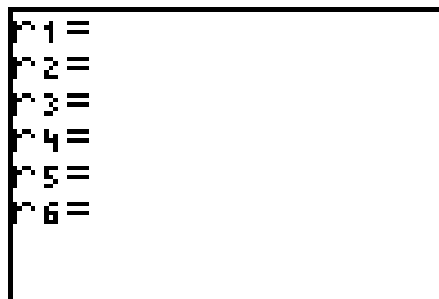
In this investigation you will discover how different values for A and B, in the polar equation $A \sin B\theta$, change the appearance of the polar rose graph. This worksheet will give step-by-step instructions on how to construct the graph of a polar rose using a graphing calculator.

Sketch:

- 1) Press **[ON]** to turn on the calculator.
- 2) Press **[CLEAR]** to clear the calculator screen of previous information.
- 3) Press **[MODE]** to display the settings for graphs and numbers.
- 4) Press **[↓] [↓] [↓]** to the row with the types of graphs available.
- 5) Then, press **[→] [→] [ENTER]** to select the **Pol** (polar) MODE.



- 6) Press **[Y=]** to display the polar Y= edit screen, which is r= for polar graphs.



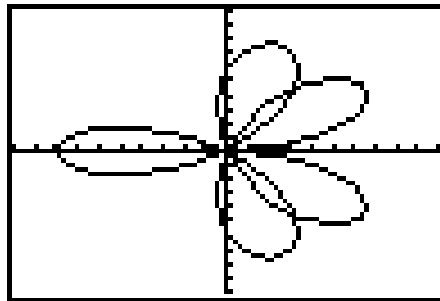
- 7) Press **[8] [SIN] [2] [.] [÷] [X,T,θ,n] [ENTER]** to define r_1 .

```

r1=8sin 2.5θ
r2=
r3=
r4=
r5=
r6=

```

- 8) Press **ZOOM** **6** to select **Zstandard** to graph the equation in the standard viewing window.
 * notice that the graph only shows five petals of the rose and that the rose does not appear symmetrical. This is because the standard WINDOW defines the WINDOW, rather than pixels, as square and sets $\theta \max = 2\pi$.



- 9) For a more accurate graph, press **WINDOW** to display the WINDOW settings.

```

WINDOW FORMAT
θmin=0
θmax=6.2831853...
θstep=.1308996...
Xmin=-10
Xmax=10
Xscl=1
↓Ymin=-10

```

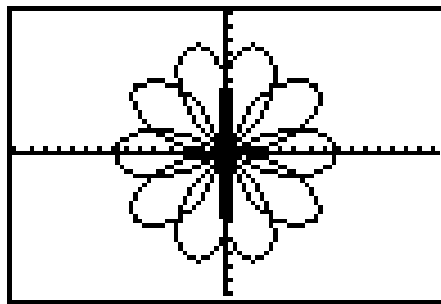
- 10) Then, press $\square \square 4 \square 2^{nd} [\pi]$ to increase the value of θ_{max} . This will redefine the parameters and give a more accurate picture of the graph.

```

WINDOW FORMAT
θmin=0
θmax=4π
θstep=.1308996...
Xmin=-10
Xmax=10
Xscl=1
Ymin=-10

```

- 11) Press $\square ZOOM \square \square$ to select **Zsquare** and plot the graph. Take notice to the number of petals the rose has and the placement of them.



Investigate:

Change the values for A and B in the polar equation according to the table below.

$A \sin B\theta$	Graph 1	Graph 2	Graph 3
A	4	6	10
B	1.5	3.5	4.5

Record what you notice about each graph (number of petals, placement of petals, and compare to other groups).

Try choosing your own values for A and B and observe what happens to the graphs. Do you notice a pattern?

Conjecture: Write your conjectures below.

Present Your Findings:

Discuss your results with a partner or a small group. To present your findings, you could draw a picture of the graph and write your conjectures along with any explanation you might have for why your conjecture is true.