Cardioids Patterns
By Janice Mitchener
15 minutes

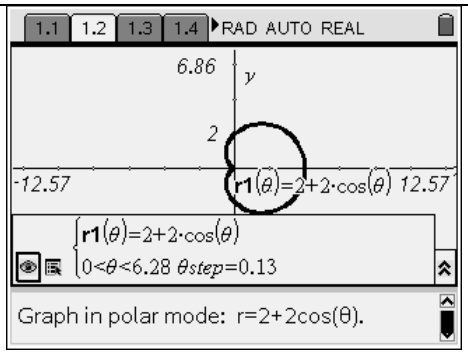
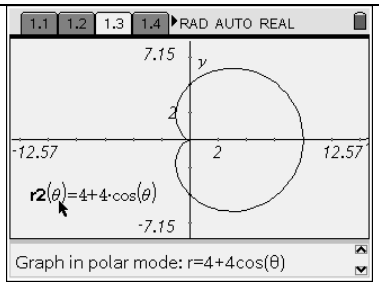
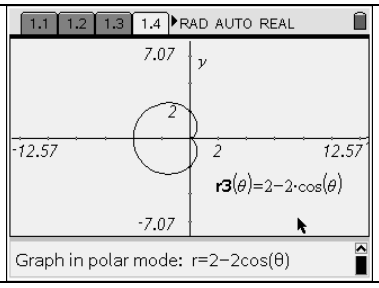
Activity Overview
This activity will give students a series of cardioids to discover a pattern of the graphs of cardioids.

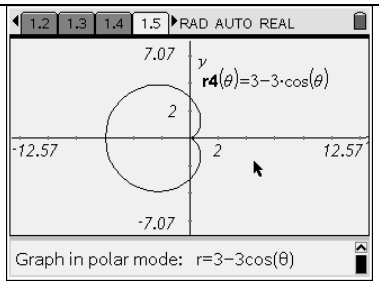
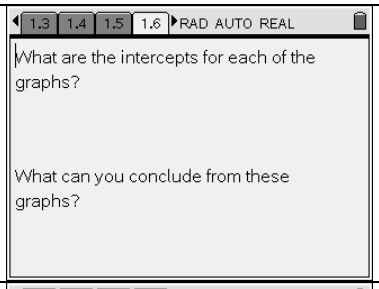
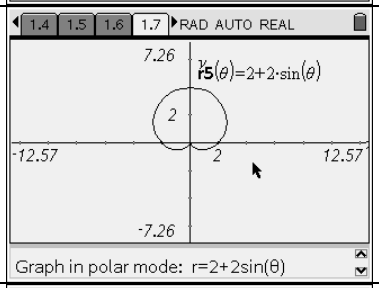
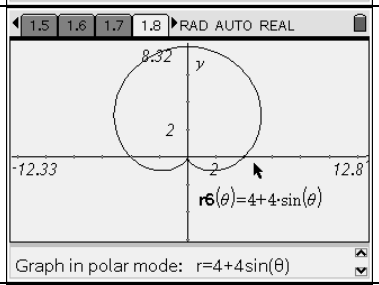
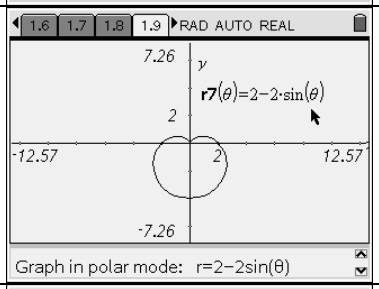
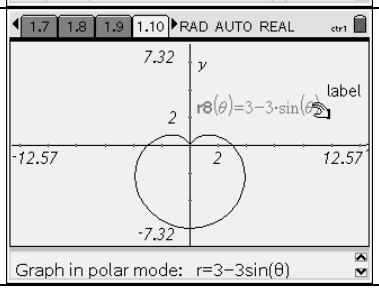
Teacher Preparation
This lesson can be used as an introduction to cardioids and the concept does not need to be introduced beforehand. The concept of polar equations and polar graphs should be discussed prior to this lesson.

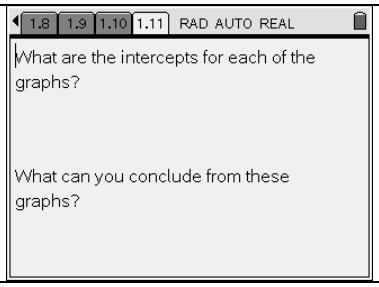
Classroom Management
This activity could be teacher led or done independently by the students.

Applications
Graphs & Geometry, Notes

Step by Step Instructions

1) In order to graph in polar mode, students will need to press (menu) **GRAPH TYPE POLAR.** Recall that (ctrl) G will remove the equation line for better viewing of the graph. Students can also trace to see the values of the points on the graph by pressing (ctrl)**TRACE Graph Trace.** Note: These are actual screen shots from the teacher solutions tns file.	
2) This is what the graph looks like with out the entry line. For a better view of the graph, the equation needs to be moved. To select the equation, place the cursor on the equation and then (ctrl) and (click). Then drag the equation to a new location and then (click) to release the equation so that it is not in the middle of the graph of the cardioid.	
3) If there is only one calculator to use as a demo for the class, the equations can be already graphed and the teacher can advance through the screens and lead the students through the exploration of the graphing patterns of the cardioid.	

4) Another option to seeing coordinates (in rectangular form) of this graph is to press (menu) POINTS AND LINES and POINT ON. Move the cursor to the graph and (click) to place a point on the graph. Press (esc) Select the point by putting the cursor on the point and press (ctrl) and (click) to actually grab the point. Use the arrow keys to move the point on the graph.	
5) This screen is a reminder to the students that they do have a student worksheet to complete.	
6) This screen switches the trig function to sine.	
7) This window had to be changed to see the entire graph. Put the cursor on a blank portion of the screen and then (ctrl) and (click) to move the "paper" to see the entire graph.	
8) Again, slight changes to the equation are made.	
9) Another slight change in the equation of the cardioid.	

10) Again, a reminder to the students that they need to also complete the student worksheet.	

Cardioids Patterns

(student) TI-Nspire files *cardioid.tns*