Eccentricity: Polar Equations of Conics
By Janice Mitchener
15 minutes

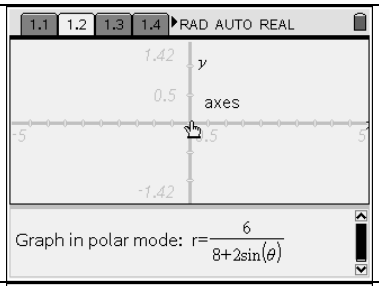
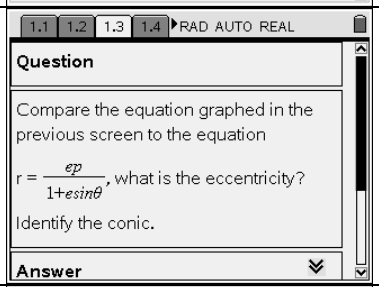
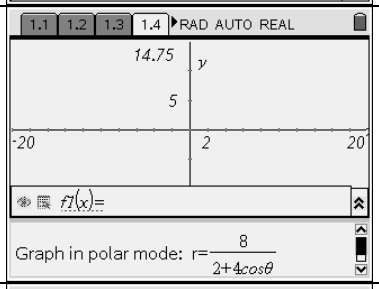
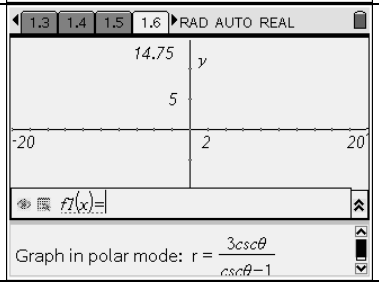
Activity Overview
This activity will give students a series of polar equations of conics to discover a pattern of the eccentricity of each type of conic.

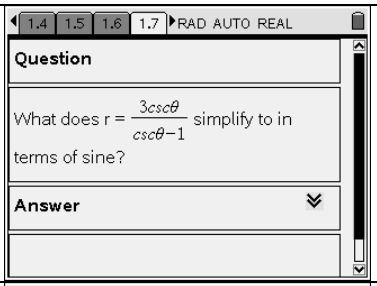
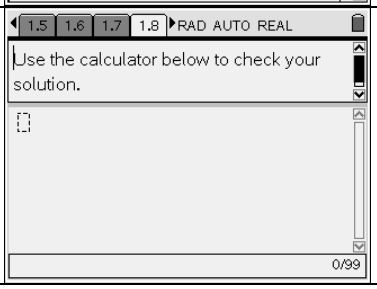
Teacher Preparation
This lesson can be used as an introduction to eccentricity and the concept does not need to be introduced beforehand. The concept of polar equations and polar graphs should be discussed prior to this lesson.

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, press (menu) **Graph Type #3 Polar**. Recall that (ctrl) (G) will remove the equation line for better viewing of the graph. Remind students to put ( ) around the θ or the equation will not be graphed.	
2) Students can type responses in the answer section of the document. Arrow down to see the entire answer section	
3) Again, change to polar mode before graphing.	
4) In this screen, type in csc(θ) in the input line. This calculator recognizes csc(θ). There is no need to change to sine in this screen.	

5) This is where the student can transfer the equation in terms of sine. To get the fraction, press ctrl and then the division sign.	
6) This calculator might have all the signs reversed compared to what the student might have. This would be a good teaching moment. In this screen, press ctrl tab to toggle between the different parts of the screen	
7) The remaining screens are self-explanatory.	

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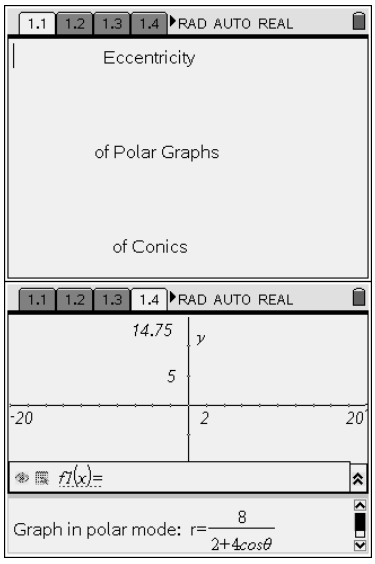
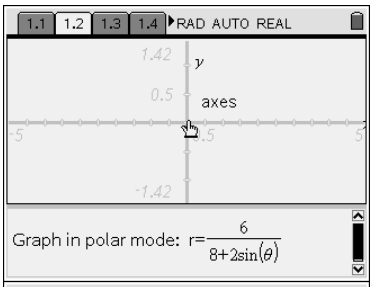
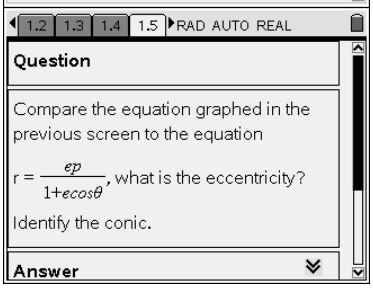
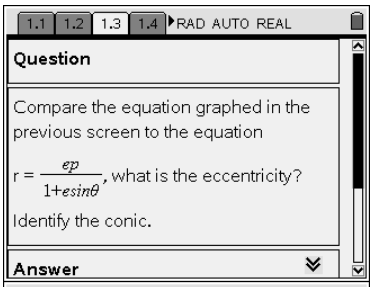
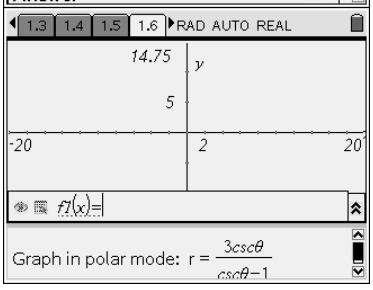
(student) TI-Nspire files *eccentricity of polar equation of conics.tns*

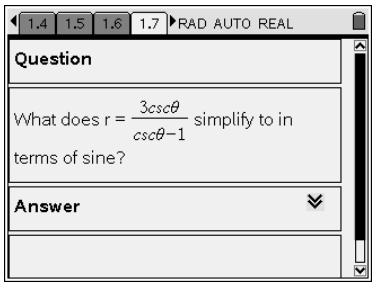


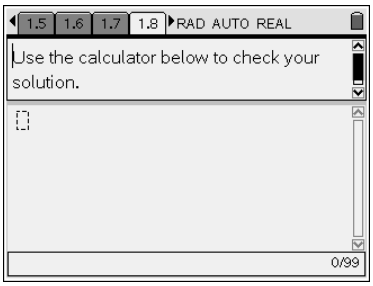


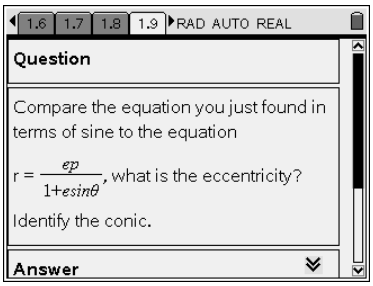












1.7 1.8 1.9 1.10 RAD AUTO REAL

Question

How can you identify the conic considering the eccentricity of a polar equation with the focus at the pole?

Answer

1.8 1.9 1.10 1.11 RAD AUTO REAL

Question

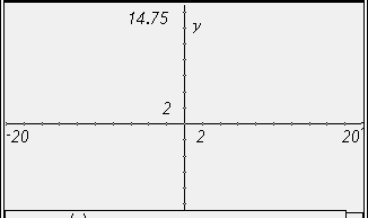
Where is the focus located when using the polar equations for conics that was used in this lesson?

Answer

1.10 1.11 1.12 1.13 RAD AUTO REAL

The following page is for you to test your hypothesis with more examples.
Remember to graph in polar mode.

1.10 1.11 1.12 1.13 RAD AUTO REAL



$f1(x)=$