Exploring Conics in Polar Form — For the Teacher

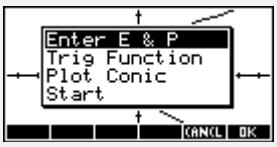
Objectives:

Using the **CONICS - POLAR FORM** aplet, the student will investigate graphs of the equations $\mathbf{r = \frac{ep}{1 \pm \sin\theta}}$ and $\mathbf{r = \frac{ep}{1 \pm \cos\theta}}$ to discover how changing the eccentricity & distance from the focus to the directrix affects the graph of a conic.

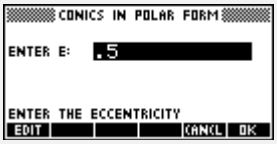
Functionality:

When the student presses **START** , the **CONICS - POLAR FORM** will be displayed.

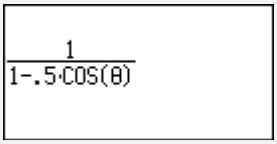
VIEWS allows the student to enter values for e and p -- the eccentricity and the distance between the directrix and the focus, respectively, select which equation to graph, and plot the graph.



Enter E & P prompts the student to enter values for e and p. In the example to the right, e=0.5 and p=2.

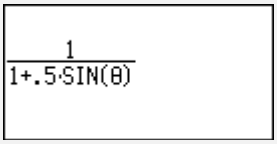


When the values of e and p have been entered, the selected equation is displayed.

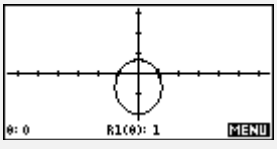


Trig Function allows the student to select the equation to be investigated.

When the equation is chosen it is displayed for verification purposes.



Plot Conic will graph the conic set up by the student.



Programs associated with this aplet:

.CPF.EP, .CPF.EQ, .CPF.ST, .CPF.SF, .CPF.SV

Exploring Conics in Polar Form

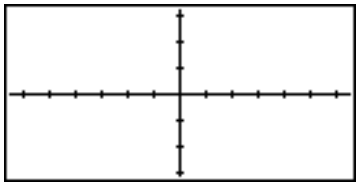
Name _____
Date _____

Directions:

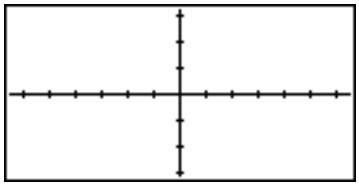
I. For each equation, write the equation in standard form, find the eccentricity, e, & the distance from the focus to the directrix, p. Find the vertices & the intercepts. Sketch & identify each conic in the provided window.

	Equation	Standard Form	e	p	vertices	intercepts
1.	$r = \frac{8}{5 - \cos\theta}$					
2.	$r = \frac{2}{1 + \sin\theta}$					
3.	$r = \frac{6}{2 - 5\sin\theta}$					
4.	$r = \frac{2}{1 + 2\cos\theta}$					
5.	$r = \frac{3}{5 - 4\sin\theta}$					
6.	$r = \frac{3}{4 - 4\cos\theta}$					

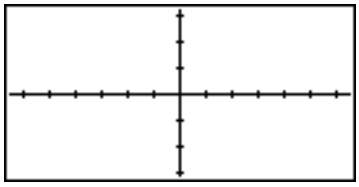
1.



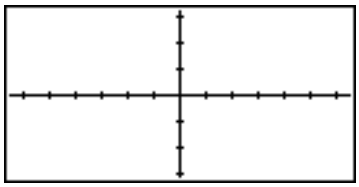
3.



5.



2.



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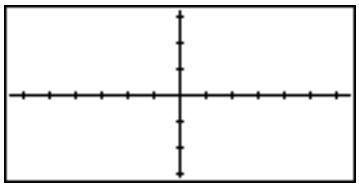

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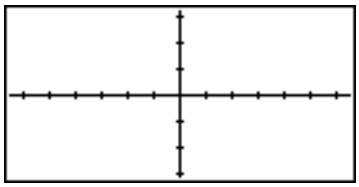

II. Based upon the information above, determine what characteristic(s) determine whether the graph is a parabola, hyperbola, or ellipse.

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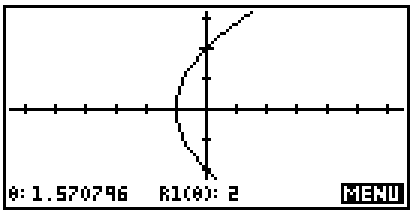
III. Find a polar equation for each of the following conics having a focus at the pole.

7.



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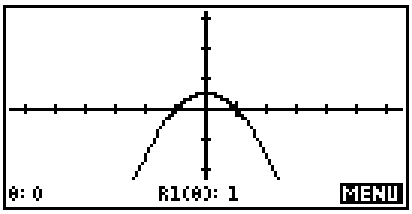
10.



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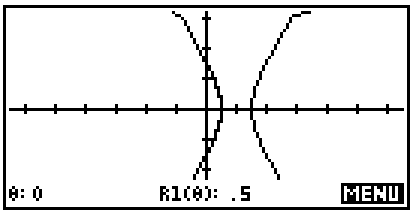
8.



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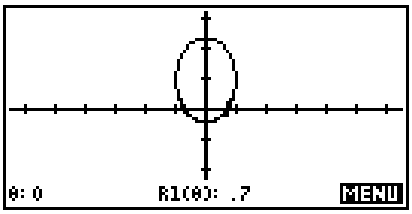
11.



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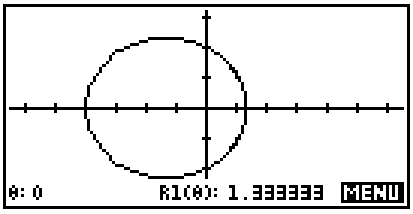
9.



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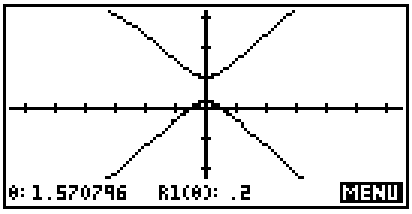
12.



eq:

IV. Investigate the eccentricity of an ellipse. Determine when the ellipse is oblong and when the ellipse is circular.

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