Course Number

Instructor

Date

Section 10.9 Polar Equations of Conics

Objective: In this lesson you learned how to define a conic in terms of eccentricity and to write equations of conics in polar form.

I. Alternative Definition of Conics (Page 791)

What you should learn
How to define conics in terms of eccentricity

The locus of a point in the plane that moves so that its distance from a fixed point (focus) is in a constant ratio to its distance from a fixed line (directrix) is a _____conic_____. The constant ratio is the _____eccentricity_____ of the conic and is denoted by e. Moreover, the conic is an ellipse if _____$e < 1$_____, a parabola if _____$e = 1$_____, and a hyperbola if _____$e > 1$_____.

For each type of conic, the _____focus_____ is at the pole.

II. Polar Equations of Conics (Pages 791–793)

What you should learn
How to write and graph equations of conics in polar form

The graph of the polar equation _____$r = ep/(1 + e \cos \theta)$_____ is a conic with a vertical directrix to the right of the pole, where $e > 0$ is the eccentricity and $|p|$ is the distance between the focus (pole) and the directrix.

The graph of the polar equation _____$r = ep/(1 - e \cos \theta)$_____ is a conic with a vertical directrix to the left of the pole, where $e > 0$ is the eccentricity and $|p|$ is the distance between the focus (pole) and the directrix.

The graph of the polar equation _____$r = ep/(1 + e \sin \theta)$_____ is a conic with a horizontal directrix above the pole, where $e > 0$ is the eccentricity and $|p|$ is the distance between the focus (pole) and the directrix.

The graph of the polar equation $r = ep/(1 - e \sin \theta)$ is a conic with a horizontal directrix below the pole, where $e > 0$ is the eccentricity and $|p|$ is the distance between the focus (pole) and the directrix.

Example 1: Identify the type of conic from the polar equation $r = \dfrac{36}{10 + 12 \sin \theta}$, and describe its orientation.

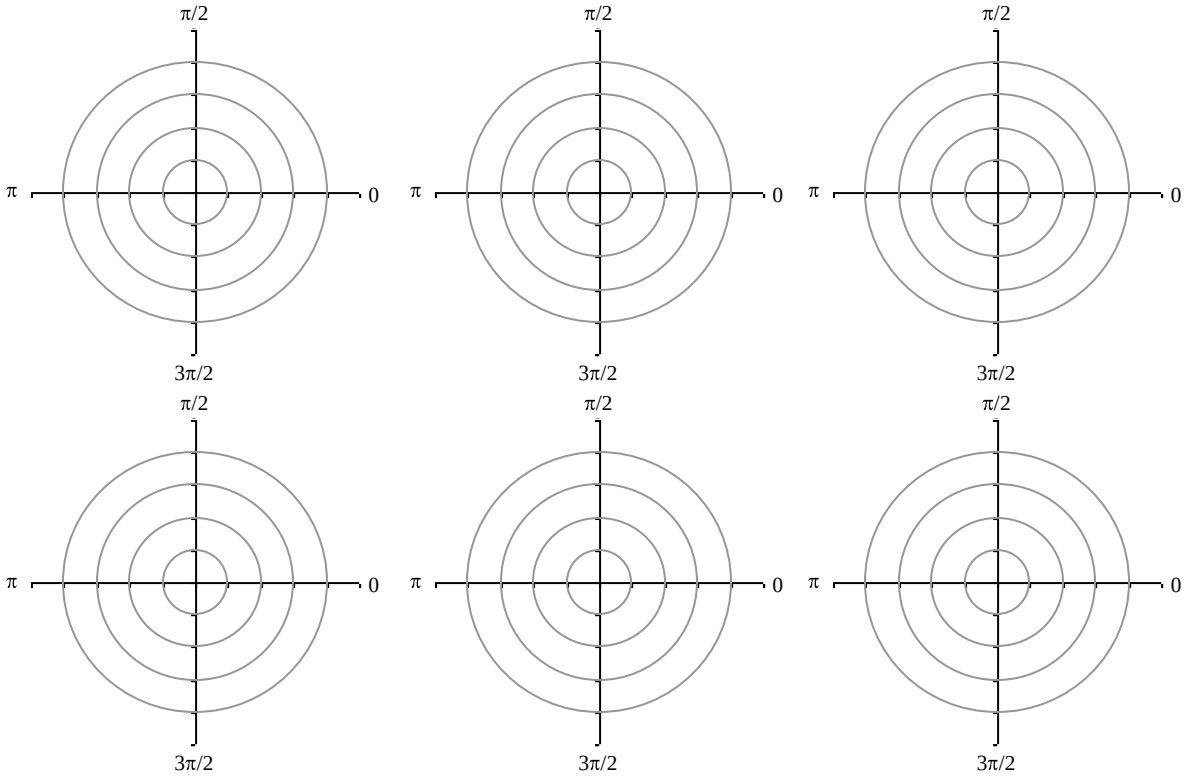
Hyperbola with a horizontal directrix above the pole

III. Applications (Page 794)

What you should learn
How to use equations of conics in polar form to model real-life problems

Describe a real-life application of polar equations of conics.

Answers will vary.



Homework Assignment

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