

## Section 10.8 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.

Course Number

Instructor

Date

### I. Alternative Definition of Conics (Page 754)

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 \_\_\_\_\_. The constant ratio is the \_\_\_\_\_ of the conic and is denoted by  $e$ . Moreover, the conic is an ellipse if \_\_\_\_\_, a parabola if \_\_\_\_\_, and a hyperbola if \_\_\_\_\_.

For each type of conic, the \_\_\_\_\_ of the polar coordinate system corresponds to the fixed point (focus) given in the above definition.

#### *What you should learn*

How to define conics in terms of eccentricity

### II. Polar Equations of Conics (Pages 754–756)

The graph of the polar equation \_\_\_\_\_ 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 \_\_\_\_\_ 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 \_\_\_\_\_ 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.

#### *What you should learn*

How to write equations of conics in polar form

The graph of the polar equation \_\_\_\_\_  
 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.

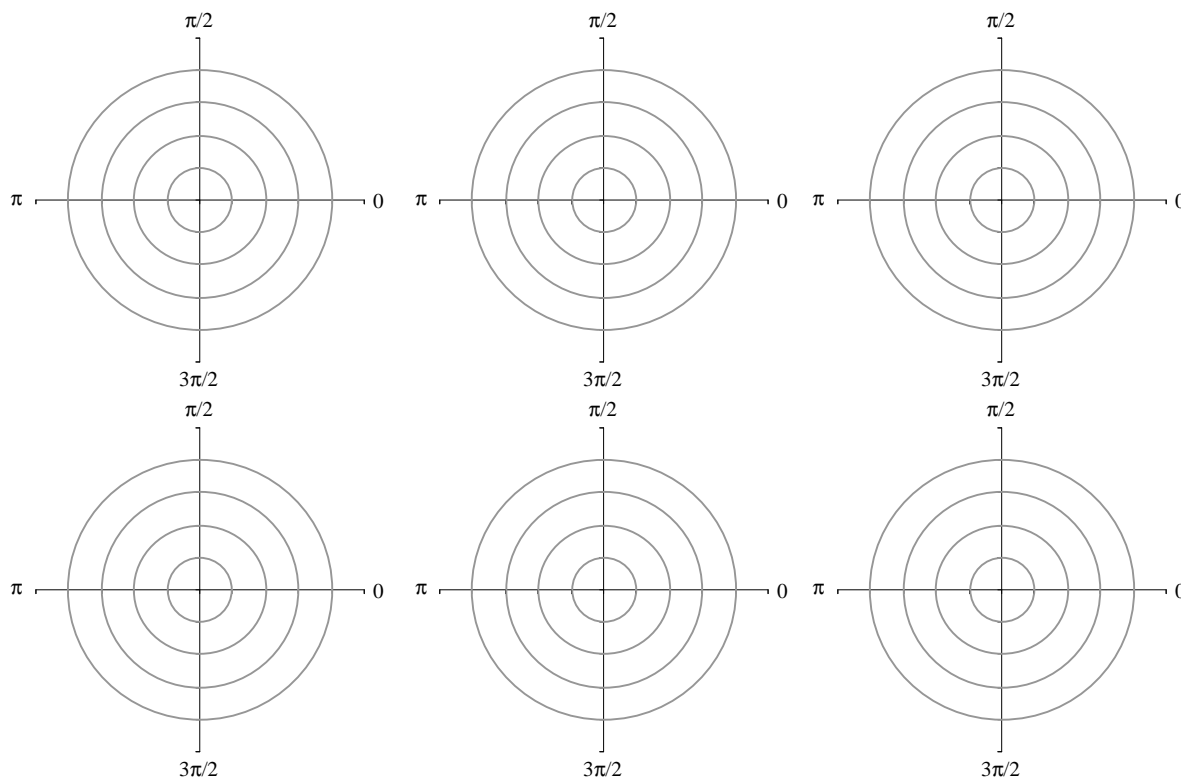
**Example 1:** Identify the type of conic from the polar equation

$$r = \frac{36}{10 + 12 \sin \theta}, \text{ and describe its orientation.}$$

### III. Applications (Page 757)

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

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



#### Homework Assignment

Page(s)

Exercises