

precalc notes 9.7

Precalc notes 9.7

Polar equations of conics

Conics can be represented in the form of

$$r = \frac{ep}{1 \pm e \cos \theta} \quad \text{or} \quad r = \frac{ep}{1 \pm e \sin \theta}$$

where e represents the eccentricity and p is the distance between the pole (origin) and directrix.

Which conic is represented?

$0 < e < 1$ ellipse

$e = 1$ parabola

$e > 1$ hyperbola

The directrix is in the form $x = \pm p$ for the $\cos \theta$ version and $y = \pm p$ for the $\sin \theta$ version.

Identify the conic. Also, find e , p , and the directrix. Then sketch the graph.

5) $r = \frac{6}{2 + \cos \theta}$

6) $r = \frac{1}{1 + 3 \cos \theta}$

7) $r = \frac{1}{2 - 2 \cos \theta}$

8) $r = \frac{3}{5 - 3 \cos \theta}$

Identify the conic. Also, find e , p , and the directrix. Then sketch the graph.

1) $r = \frac{2}{1 - \sin \theta}$

2) $r = \frac{2}{1 - 3 \sin \theta}$

3) $r = \frac{1}{2 + 4 \sin \theta}$

4) $r = \frac{12}{6 + 3 \sin \theta}$

Find the polar equation of the conic with its focus at the pole.

9) parabola $e = 1$, directrix $x = 2$

10) ellipse $e = \frac{3}{4}$, directrix $y = -1$