

Sections 11.3, 11.4: Polar Coordinates - Worksheet

1. Convert the following Cartesian equations to polar.

(a) $y = 11$.

(c) $(x - 3)^2 + y^2 = 9$.

(e) $x^2 + y^2 + xy = 2$.

(b) $x + y = 0$.

(d) $y = 7 + 2x$.

(f) $y^2 = 3x^2$.

2. Convert the following polar equations to Cartesian. Then describe the graph.

(a) $r = -7 \sec(\theta)$.

(c) $\theta = \frac{\pi}{6}$.

(e) $r = 5 \sin(\theta)$.

(b) $r = \frac{5}{3 \sin(\theta) - 4 \cos(\theta)}$.

(d) $r = 3 \cot(\theta) \csc(\theta)$.

(f) $r = 2 \cos(\theta) + 6 \sin(\theta)$.

3. For each the following polar curves, identify the symmetries and sketch the graph.

(a) $r = 9$.

(c) $r = 3 \sin(2\theta)$.

(e) $r = 1 - \cos(\theta)$.

(b) $r = 8 \cos(\theta)$.

(d) $r = 5 \cos(5\theta)$.

(f) $r = \sqrt{3} + 2 \sin(\theta)$.

4. Find an equation of the tangent line to the following polar curves at the given value of θ .

(a) $r = \cos(3\theta)$, $\theta = \frac{\pi}{4}$.

(b) $r = 1 + 2 \sin(\theta)$, $\theta = \frac{\pi}{6}$.