

MA 114 Worksheet # 23: Polar Coordinates

1. For the Cartesian coordinate points

- (a) $(2, -2)$
- (b) $(1, -2)$
- (c) $(-1, \sqrt{3})$

find the polar coordinate representation.

2. For the polar coordinate points

- (a) $(1, \pi)$
- (b) $(-1, \pi/2)$
- (c) $(1, -\pi/4)$

find the Cartesian coordinate representation.

3. Sketch the graph of the polar curves:

- (a) $\theta = -\pi$
- (b) $r = -\pi$
- (c) $r = \cos(\theta)$
- (d) $r = \cos(2\theta)$
- (e) $r = 1 + \cos(\theta)$

4. Find the polar equation for:

- (a) $x^2 + y^2 = 9$.
- (b) $x + y = 4$.
- (c) $x = 4$
- (d) $xy = 4$

5. Determine the distance between the polar points (r_1, θ_1) and (r_2, θ_2) .

6. Find dy/dx for the following polar curves.

- (a) $r = 2 \cos \theta + 1$
- (b) $r = 1/\theta$
- (c) $r = 2e^{-\theta}$

7. In the following, compute the slope of the tangent line at the given point. Then sketch the curve and the tangent line.

$$\begin{array}{ll} r = \sin \theta & \theta = \pi/3 \\ r = 1/\theta & \theta = \pi/2 \end{array}$$