

## Section 3-6 : Polar Coordinates

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1. For the point with polar coordinates  $(2, \frac{\pi}{7})$  determine three different sets of coordinates for the same point all of which have angles different from  $\frac{\pi}{7}$  and are in the range  $-2\pi \leq \theta \leq 2\pi$ .
2. The polar coordinates of a point are  $(-5, 0.23)$ . Determine the Cartesian coordinates for the point.
3. The Cartesian coordinate of a point are  $(2, -6)$ . Determine a set of polar coordinates for the point.
4. The Cartesian coordinate of a point are  $(-8, 1)$ . Determine a set of polar coordinates for the point.

For problems 5 and 6 convert the given equation into an equation in terms of polar coordinates.

5. 
$$\frac{4x}{3x^2 + 3y^2} = 6 - xy$$

6. 
$$x^2 = \frac{4x}{y} - 3y^2 + 2$$

For problems 7 and 8 convert the given equation into an equation in terms of Cartesian coordinates.

7. 
$$6r^3 \sin \theta = 4 - \cos \theta$$

8. 
$$\frac{2}{r} = \sin \theta - \sec \theta$$

For problems 9 – 16 sketch the graph of the given polar equation.

9. 
$$\cos \theta = \frac{6}{r}$$

10. 
$$\theta = -\frac{\pi}{3}$$

11. 
$$r = -14 \cos \theta$$

12. 
$$r = 7$$

13. 
$$r = 9 \sin \theta$$

14. 
$$r = 8 + 8 \cos \theta$$

15.  $r = 5 - 2\sin \theta$

16.  $r = 4 - 9\sin \theta$

## Section 3-7 : Tangents with Polar Coordinates

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1. Find the tangent line to  $r = \sin(4\theta)\cos(\theta)$  at  $\theta = \frac{\pi}{6}$ .
2. Find the tangent line to  $r = \theta - \cos(\theta)$  at  $\theta = \frac{3\pi}{4}$ .