

Pre-Calculus Honors Homework Packet

Unit 8: Polars

8.1 Graphing Polar Coordinates

1. Plot the following:

A. $\left(6, \frac{7\pi}{6}\right)$

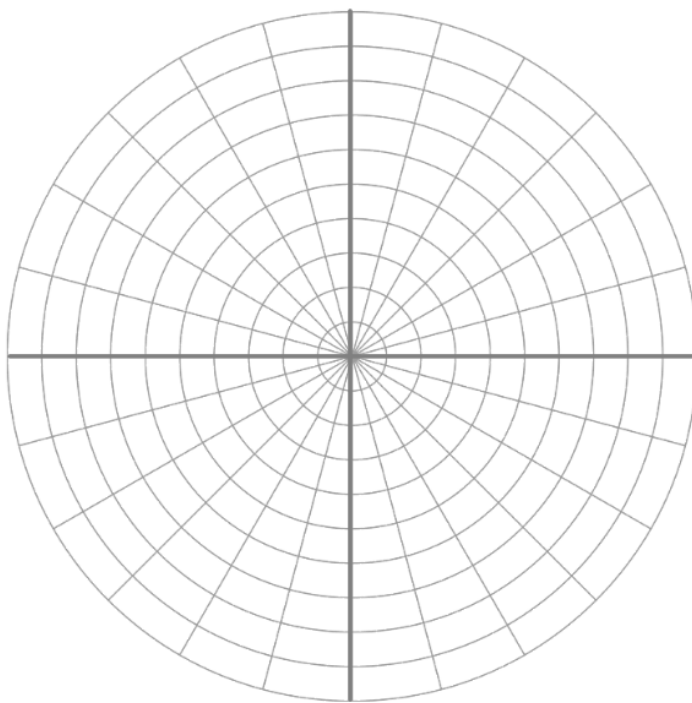
B. $\left(3, -\frac{3\pi}{4}\right)$

C. $(8, \pi)$

D. $\left(-6, \frac{5\pi}{3}\right)$

E. $\left(-5, -\frac{11\pi}{6}\right)$

F. $\left(-4, -\frac{2\pi}{3}\right)$



For each polar coordinate below, give three additional equivalent polar coordinates. Then find the rectangular coordinates for the point.

2. $\left(4, \frac{5\pi}{6}\right)$

3. $\left(8, -\frac{2\pi}{3}\right)$

4. $\left(-4, \frac{5\pi}{3}\right)$

Given the rectangular coordinates below, find the polar coordinates:

5. $(3, -3)$

6. $(-5, -5\sqrt{3})$

7. $(4\sqrt{3}, 4)$

8.2 Graphing Polar Equations

A. Write a description for each equation.

1. $r = 3 + \sin \theta$

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

11. $r = 3\csc \theta$

2. $r = 2$

7. $r = 3(1 + 2\sin \theta)$

12. $r = 10\cos \theta$

3. $r = 3\cos (2\theta)$

8. $r = 6(1 + \cos \theta)$

13. $r = 4\sec \theta$

4. $r = 2\sin \theta + 3$

9. $\theta = 330^\circ$

5. $r = 2 - 4\cos \theta$

10. $r = -8\sin \theta$

B. Match each equation with a description on the right.

1. $r = 4 + 4\sin \theta$

9. $\theta = 60^\circ$

A. Limacon with an extra loop

2. $r = 5$

10. $x^2 + y^2 - 10y = 0$

B. Limacon with no extra loop

3. $r = 3\cos 3\theta$

11. $r = 5 + 5\cos \theta$

C. Cardioid

4. $r = 2 + 3\sin \theta$

12. $r = 4 + 3\sin \theta$

D. Rose

5. $r = 4 - 6\cos \theta$

13. $r = 2\sec \theta$

E. Circle

6. $r = -2\sin 2\theta$

14. $r = 1 + \sin \theta$

F. Line

7. $r = 3(1 + 2\sin \theta)$

8. $r = 5(1 - 10\sin \theta)$

C. Answer the following questions.

1. What is the radius of the circle $r = -7$?

2. Given: $r = 24\sin 2\theta$

a. What is the length of the petal?

b. Where is the first petal drawn?

c. How far apart are the petals spaced?

d. At what angle measures will the petals be drawn?

D. Find the r value for the given angle.

1. $r = 4\cos \theta$ for $\frac{\pi}{6}$

4. $r = 2 - 4\cos \theta$ for $\frac{4\pi}{3}$

2. $r = 3 + 3\sin \theta$ for $\frac{\pi}{4}$

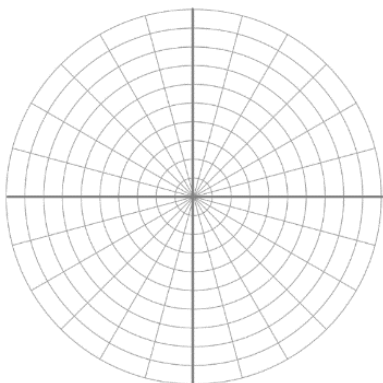
5. $r = 5\sin 9\theta$ for $\frac{\pi}{6}$

3. $r = 4 + 2\sin \theta$ for $\frac{5\pi}{6}$

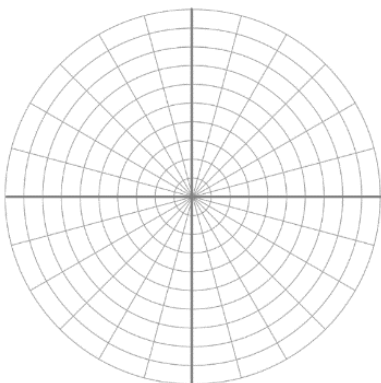
6. $r = 4\cos 4\theta$ for $\frac{\pi}{4}$

E. Graph the following polar equations.

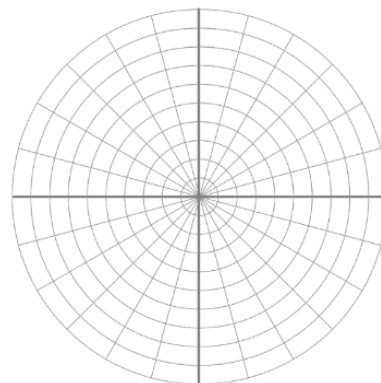
1. $r = 5\cos \theta$



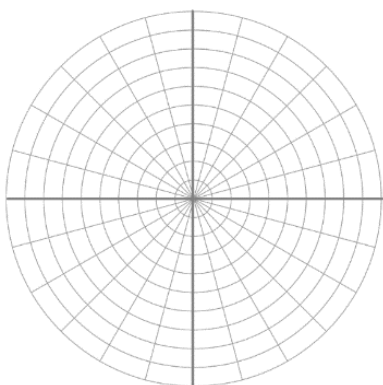
2. $r = -4\sin \theta$



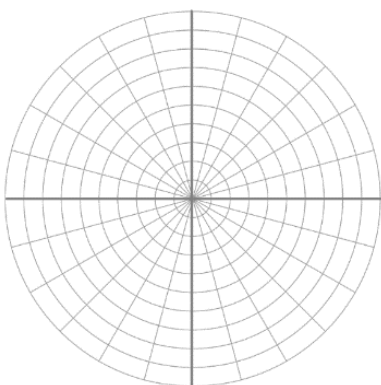
3. $r = 4\cos 3\theta$



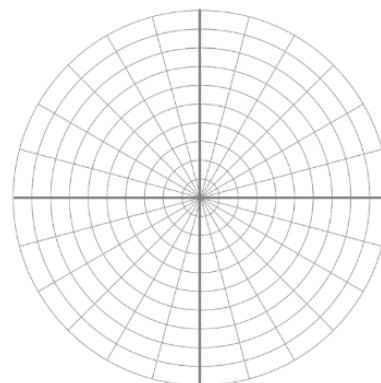
4. $r = 8\sin 2\theta$



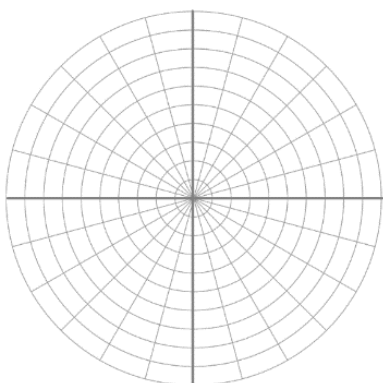
6. $r = 4 + 3\cos \theta$



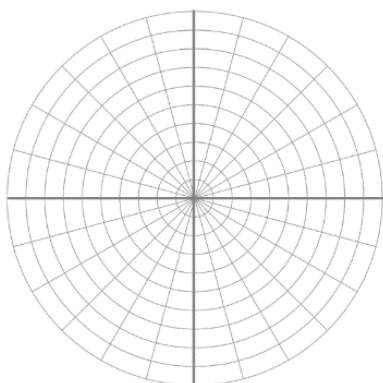
8. $\theta = -\frac{\pi}{4}$



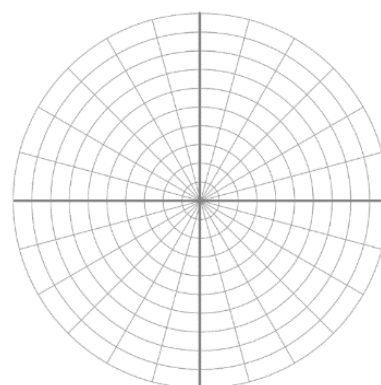
5. $r = 5 + 5\cos \theta$



7. $r = 3 + 6\sin \theta$



9. $r = 8$



8.3 Converting Polar and Rectangular Equations

Convert the following polar equations to rectangular equations:

1. $r = 8$

4. $r = 7 \sin \theta$

2. $r \cos \theta = 6$

5. $r = -3 \sec \theta$

3. $r = -5 \csc \theta$

6. $r = 5 \cos \theta$

Convert the following rectangular equations to polar equations:

7. $x^2 + y^2 = 10$

10. $y = -5$

8. $2x - y^2 = 0$

11. $y^2 = 10x$

9. $x^2 + y^2 = 81$

12. $3xy = 7$