



2023-2024

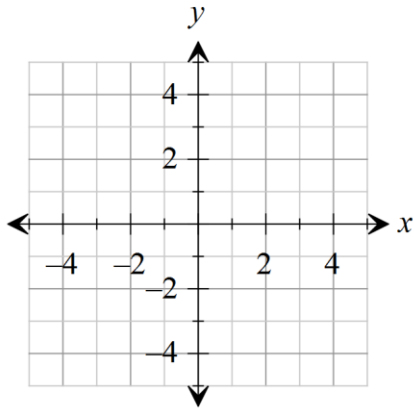
9.1 Polar Equations

SCORE: /

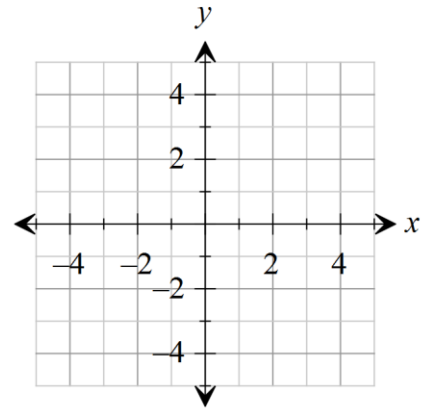
Name _____ Date _____ Period _____

Graph the rectangular coordinates. Find polar coordinates for each given point using radian measure for the angle, whenever possible.

1. (3, 3)



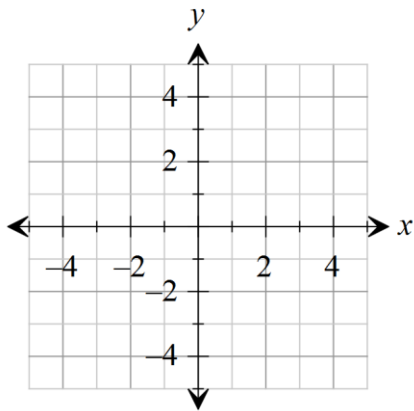
2. (0, 3)



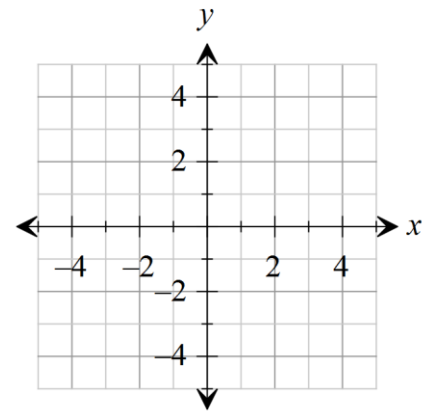
Polar coordinates _____

Polar coordinates _____

3. (-4, -2)



4. (-2, 0)

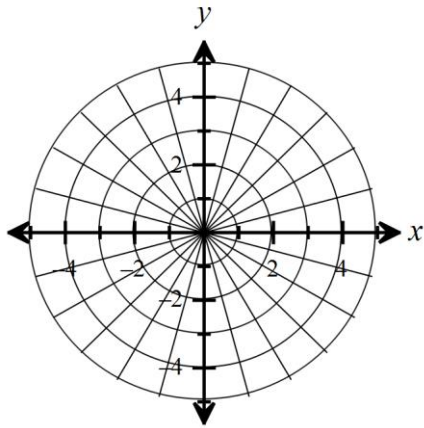


Polar coordinates _____

Polar coordinates _____

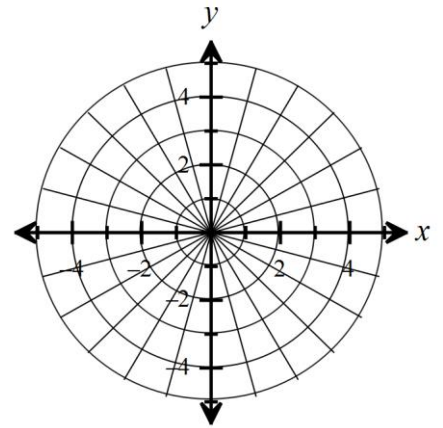
Graph polar coordinates. Find rectangular coordinates for each given point.

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



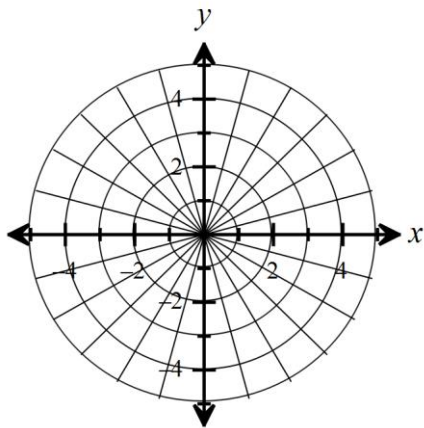
Rectangular coordinates _____

6. $(2, \pi)$



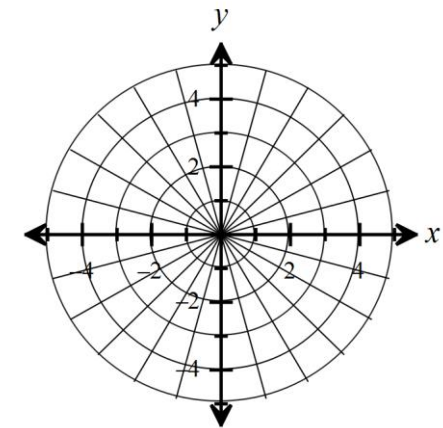
Rectangular coordinates _____

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



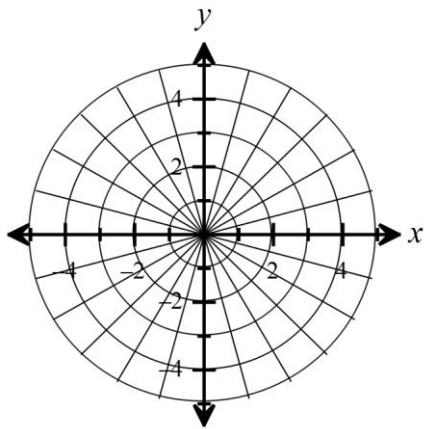
Rectangular coordinates _____

8. $(3, -225^\circ)$



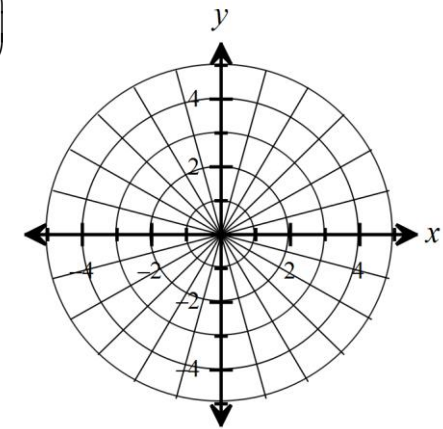
Rectangular coordinates _____

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



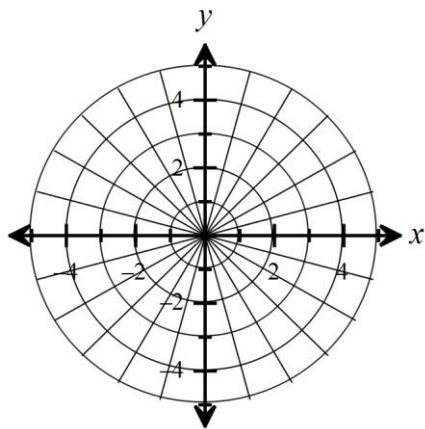
Rectangular coordinates _____

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



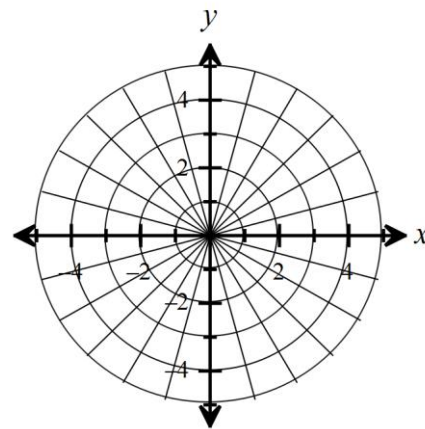
Rectangular coordinates _____

11. $\left(-1, -\frac{4\pi}{3}\right)$



Rectangular coordinates _____

12. $\left(-4, \frac{\pi}{6}\right)$



Rectangular coordinates _____

Convert the polar coordinates of each point to rectangular coordinates.

13. $\left(1, \frac{\pi}{6}\right)$

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

15. $\left(\sqrt{2}, 135^\circ\right)$

16. $\left(\frac{-\sqrt{2}}{2}, -45^\circ\right)$

Convert the rectangular coordinates of each point to polar coordinates. Use degrees for θ . Round to the nearest tenth if needed.

17. $(-2, 2)$

18. $(-2, 2\sqrt{3})$

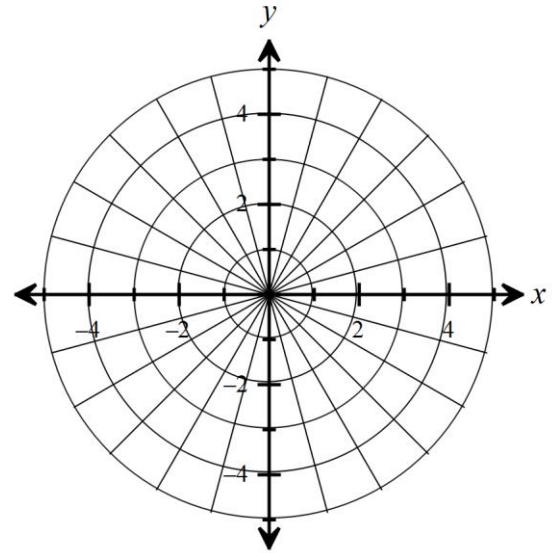
19. $(0, 2)$

20. $(1, 4)$

Complete the table for the following polar equations. Graph the points.

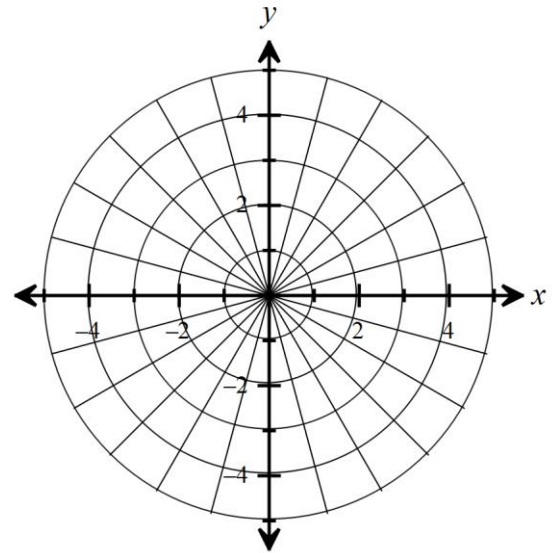
21. $r = 3 \sin \theta$

θ	r
0	
$\frac{\pi}{4}$	
$\frac{\pi}{2}$	
$\frac{3\pi}{4}$	
π	
$\frac{5\pi}{4}$	
$\frac{3\pi}{2}$	
$\frac{7\pi}{4}$	
2π	



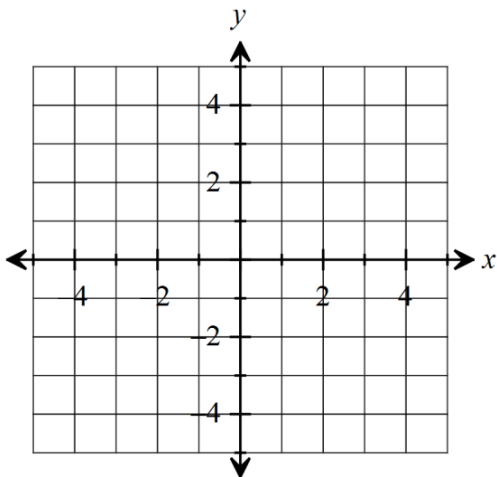
22. $r = 2 \cos 2\theta$

θ	r
0	
$\frac{\pi}{4}$	
$\frac{\pi}{2}$	
$\frac{3\pi}{4}$	
π	
$\frac{5\pi}{4}$	
$\frac{3\pi}{2}$	
$\frac{7\pi}{4}$	
2π	

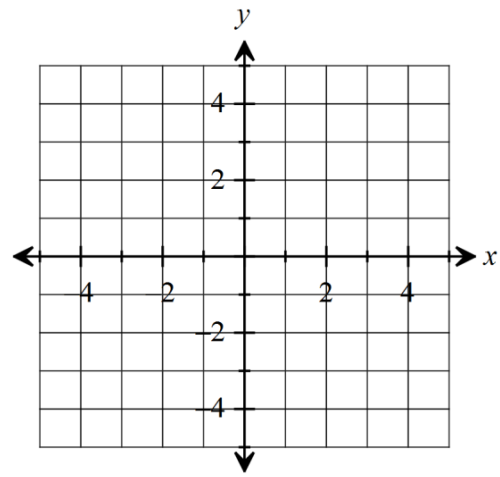


Use your calculator to graph each polar equation. Then sketch the graph of each polar equation.

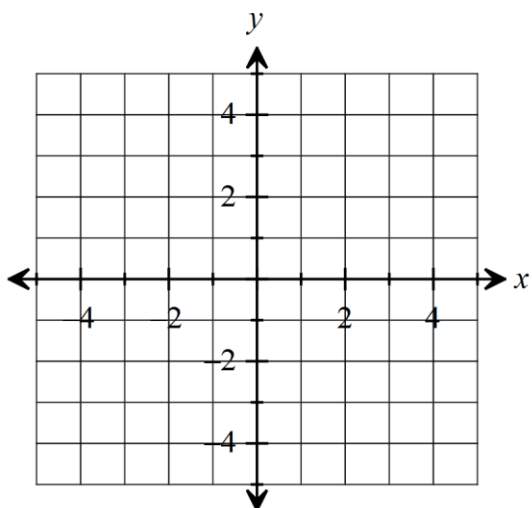
23. $r = 2 \sin \theta$



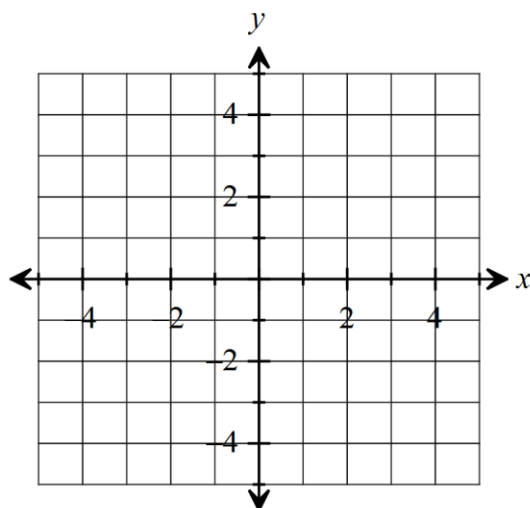
24. $r = 3 \cos 2\theta$



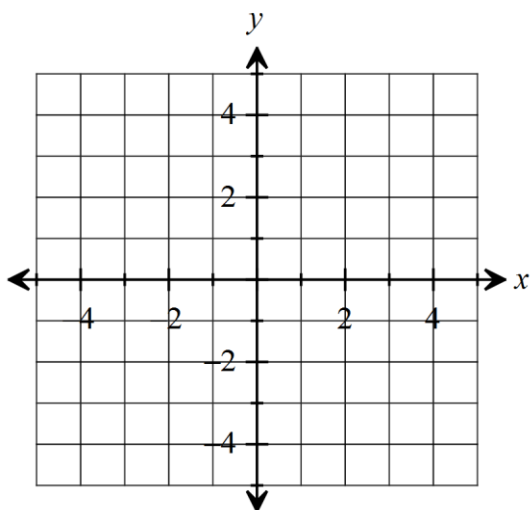
25. $r = 1 + \cos \theta$ (cardioid)



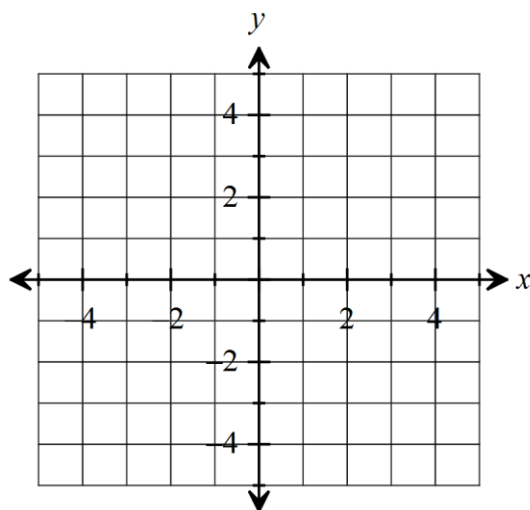
26. $r^2 = 9 \cos 2\theta$ (lemniscate)



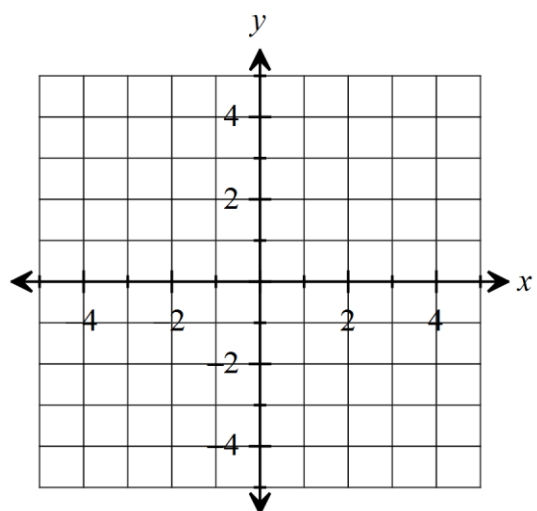
27. $r = 4 \cos 2\theta$ (four-leaf rose)



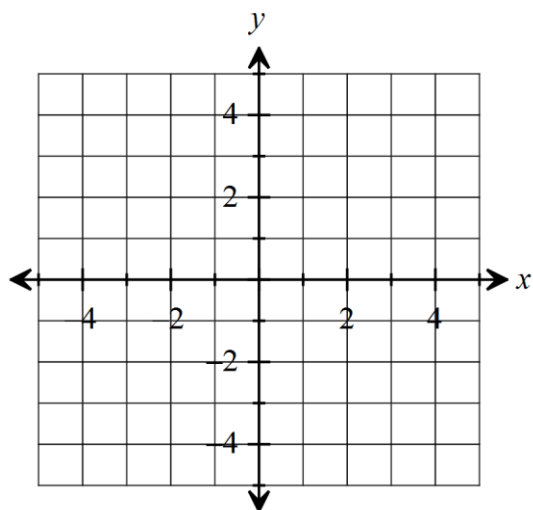
28. $r = 2 \sin 3\theta$ (three-leaf rose)



29. $r = 1 + 2 \cos \theta$ (limaçon)



30. $r = 3.5$



For each polar equation, write an equivalent rectangular equation.

31. $r = 4\cos\theta$

32. $r = 5$

33. $\theta = \frac{\pi}{4}$

For each rectangular equation, write an equivalent polar equation.

34. $x = 4$

35. $y = -6$

36. $x^2 + y^2 = 4$

For each polar equation, write an equivalent rectangular equation.

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

38. $r = -2$

39. $r = 6\cos\theta$

For each rectangular equation, write an equivalent polar equation.

40. $x^2 + y^2 = 25$

41. $x = -2$

42. $y = 3$

Review

Simplify the following expression. Show work!

43. $\frac{-6}{x-3} + \frac{5}{x-2}$

44. $\frac{x-3}{2x-1} + \frac{x+5}{2x^2+9x-5}$

45. Find the length of the diagonal across from the bigger angle of a parallelogram. The sides of the parallelogram are 5 cm by 8 cm and the bigger angle is 121° as shown. Round your answer to the nearest tenth.

