9-3 Polar and Rectangular Forms of Equations

Find the rectangular coordinates for each point with the given polar coordinates. Round to the nearest hundredth, if necessary.

2. $\left(\frac{1}{4}, \frac{\pi}{2}\right)$

ANSWER:

$\left(0, \frac{1}{4}\right)$

4. (2.5, 250°)

ANSWER:

(−0.86, −2.35)

6. (−13, −70°)

ANSWER:

(−4.45, 12.22)

8. $\left(\frac{1}{2}, \frac{3\pi}{4}\right)$

ANSWER:

$\left(-\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}\right)$

10. (4, 210°)

ANSWER:

$\left(-2\sqrt{3}, -2\right)$

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

ANSWER:

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

Find two pairs of polar coordinates for each point with the given rectangular coordinates if $0 \leq \theta \leq 2\pi$. Round to the nearest hundredth, if necessary.

14. (−13, 4)

ANSWER:

(13.60, 2.84) and (−13.60, 5.98)

16. (4, −12)

ANSWER:

(12.65, 5.03) and (−12.65, 1.89)

18. (0, −173)

ANSWER:

$\left(173, \frac{3\pi}{2}\right)$ and $\left(-173, \frac{\pi}{2}\right)$

20. (−14, 14)

ANSWER:

$\left(14\sqrt{2}, \frac{3\pi}{4}\right)$ and $\left(-14\sqrt{2}, \frac{7\pi}{4}\right)$

22. $(3b, -4b)$, $b > 0$

ANSWER:

$(5b, 5.35)$ and $(-5b, 2.21)$

24. $(2, \sqrt{2})$

ANSWER:

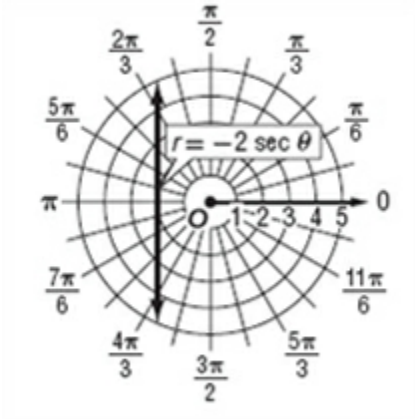
(2.45, 0.62) and (−2.45, 3.76)

Identify the graph of each rectangular equation. Then write the equation in polar form. Support your answer by graphing the polar form of the equation.

26. $x = -2$

ANSWER:

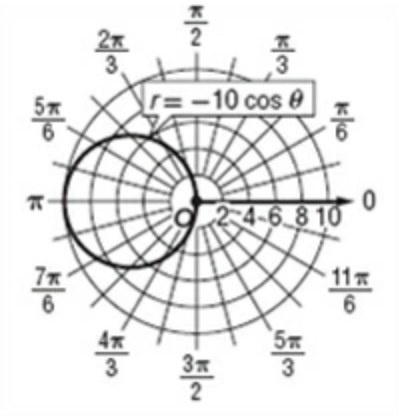
line; $r = -2\sec\theta$



27. $(x + 5)^2 + y^2 = 25$

ANSWER:

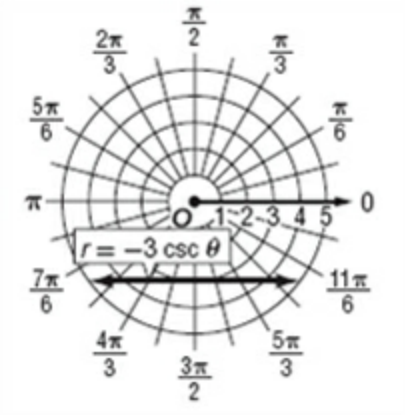
circle; $r = -10 \cos \theta$



28. $y = -3$

ANSWER:

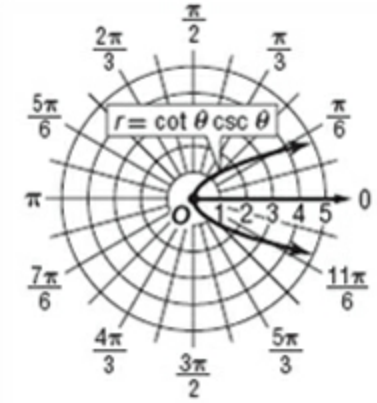
line; $r = -3 \csc \theta$



29. $x = y^2$

ANSWER:

parabola ; $r = \cot \theta \csc \theta$

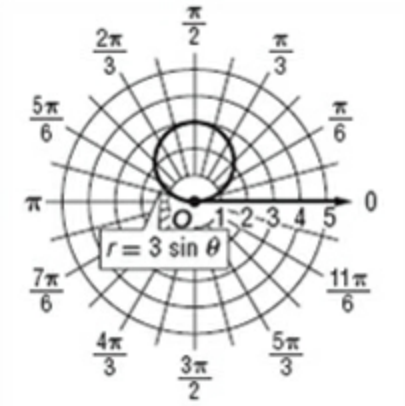


Write each equation in rectangular form, and then identify its graph. Support your answer by graphing the polar form of the equation.

36. $r = 3 \sin \theta$

ANSWER:

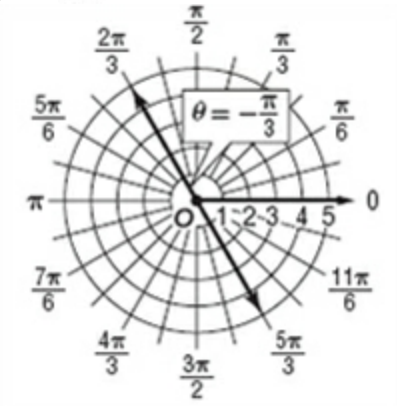
$x^2 + y^2 - 3y = 0$; circle



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

ANSWER:

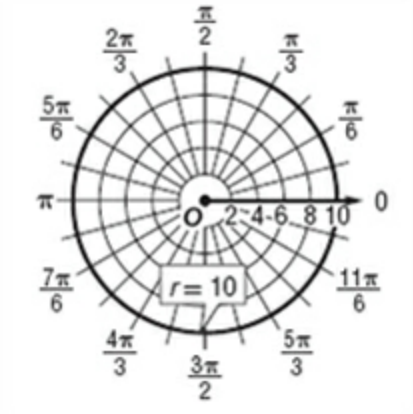
$y = -\sqrt{3}\,x$; line



38. $r = 10$

ANSWER:

$x^2 + y^2 = 100$; circle



39. $r = 4 \cos \theta$

ANSWER:

$x^2 - 4x + y^2 = 0$; circle