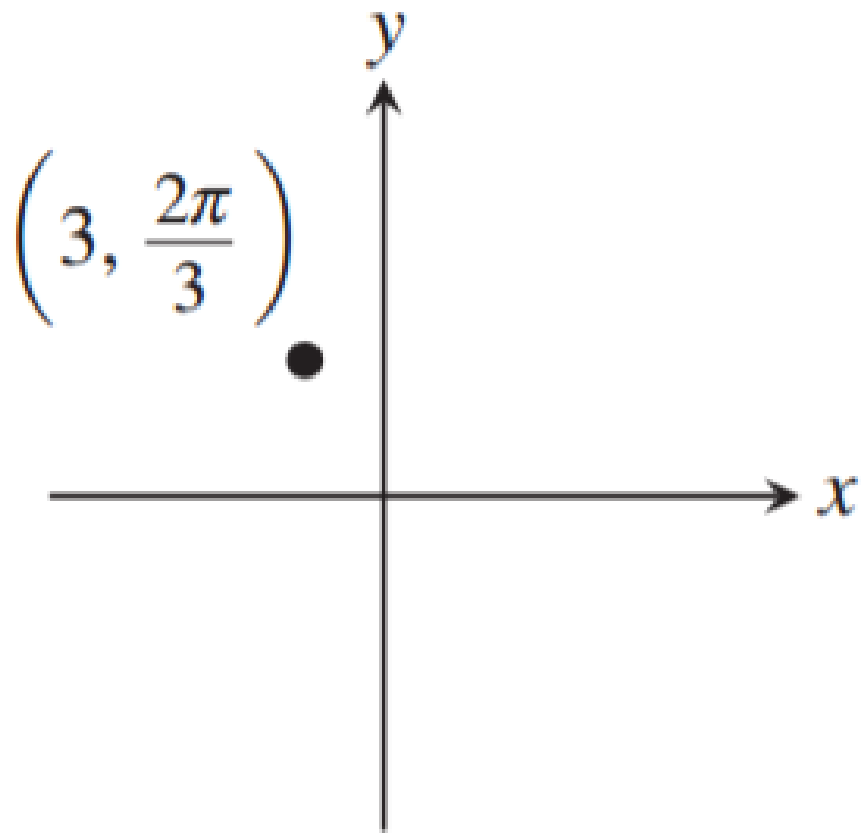
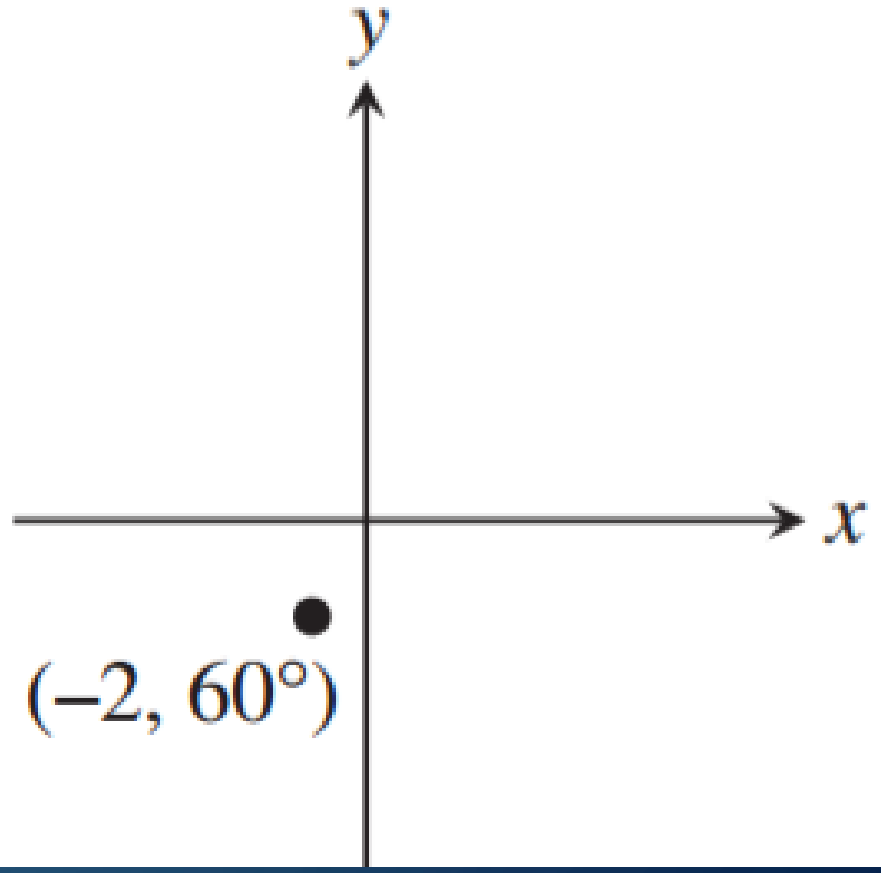
In Exercises 1–4, the polar coordinates of a point are given. Find its rectangular coordinates.

1.



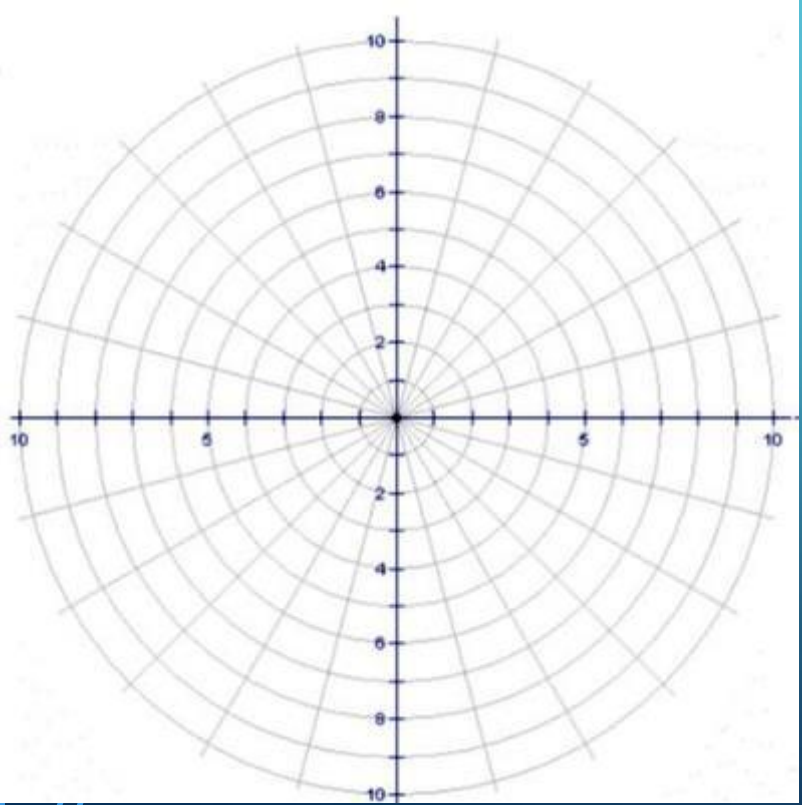
3.



In Exercises 5 and 6, **(a)** complete the table for the polar equation and **(b)** plot the corresponding points.

5. $r = 3 \sin \theta$

θ	$\pi/4$	$\pi/2$	$5\pi/6$	π	$4\pi/3$	2π
r						



In Exercises 7–14, plot the point with the given polar coordinates.

7. $(3, 4\pi/3)$

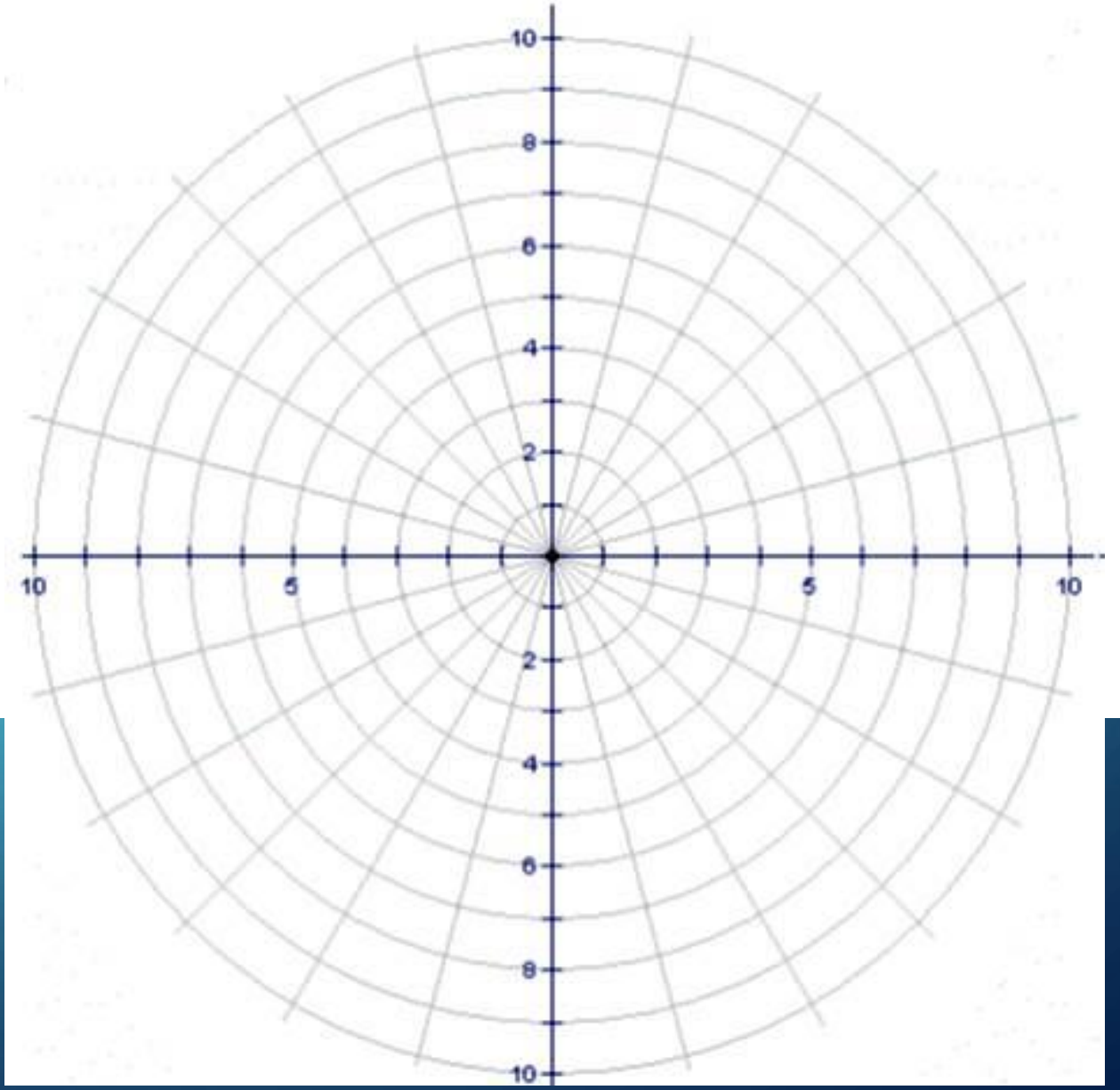
8. $(2, 5\pi/6)$

11. $(2, 30°)$

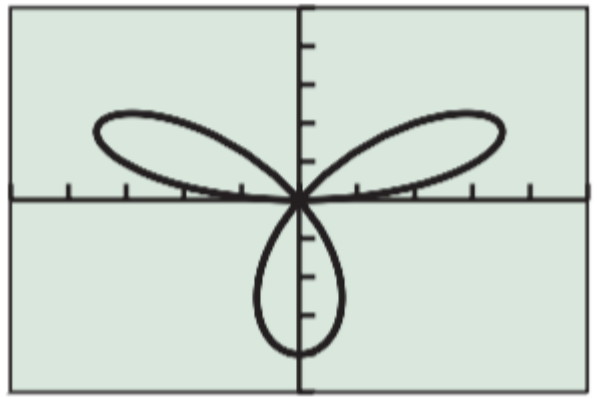
12. $(3, 210°)$

13. $(-2, 120°)$

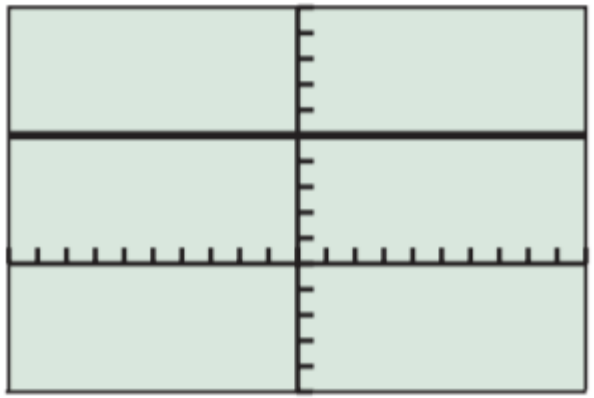
14. $(-3, 135°)$



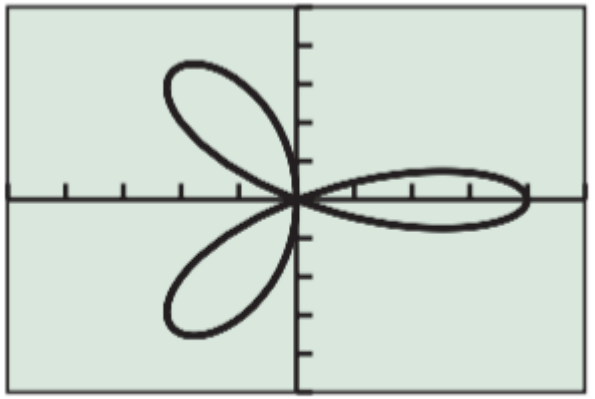
In Exercises 31–34, use your grapher to match the polar equation with its graph.



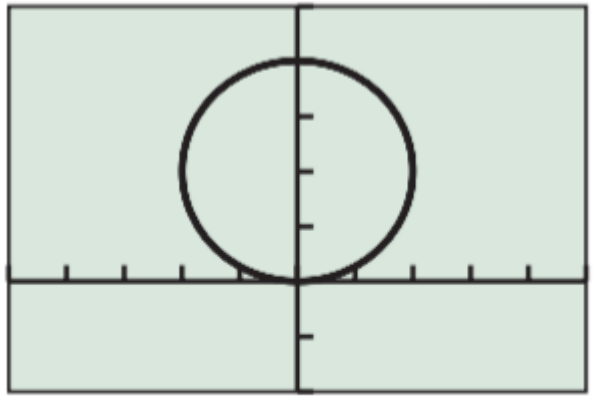
(a)



(b)



(c)



(d)

31. $r = 5 \csc \theta$

32. $r = 4 \sin \theta$

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

34. $r = 4 \sin 3\theta$

In Exercises 35–42, convert the polar equation to rectangular form and identify the graph. Support your answer by graphing the polar equation.

35. $r = 3 \sec \theta$

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

In Exercises 43–50, convert the rectangular equation to polar form. Graph the polar equation.

44. $x = 5$

45. $2x - 3y = 5$

49. $(x + 3)^2 + (y + 3)^2 = 18$

52. Tracking Ships The location of two ships from Mays Landing Lighthouse, given in polar coordinates, are (3 mi, 170°) and (5 mi, 150°). Find the distance between the ships.

57. Multiple Choice If $r \neq 0$, which of the following polar coordinate pairs represents the same point as the point with polar coordinates (r, θ)?

(A) $(-r, \theta)$ **(B)** $(-r, \theta + 2\pi)$ **(C)** $(-r, \theta + 3\pi)$

(D) $(r, \theta + \pi)$ **(E)** $(r, \theta + 3\pi)$

58. Multiple Choice Which of the following are the rectangular coordinates of the point with polar coordinate $(-2, -\pi/3)$?

(A) $(-\sqrt{3}, 1)$ **(B)** $(-1, -\sqrt{3})$ **(C)** $(-1, \sqrt{3})$

(D) $(1, -\sqrt{3})$ **(E)** $(1, \sqrt{3})$

59. Multiple Choice Which of the following polar coordinate pairs represent the same point as the point with polar coordinates $(2, 110°)$?

(A) $(-2, -70°)$ **(B)** $(-2, 110°)$ **(C)** $(-2, -250°)$

(D) $(2, -70°)$ **(E)** $(2, 290°)$