

Precalculus G11 Ch9 Qs. bank

Indicate the answer choice that best completes the statement or answers the question.

Write each equation in rectangular form.

1. $\theta = -\frac{7\pi}{6}$

a. $y = -\frac{\sqrt{3}}{3}x$

b. $y = -\sqrt{3}x$

c. $y = \frac{\sqrt{3}}{3}x$

d. $y = -x$

2. Write the polar equation in rectangular form.

$r = 6 \sin \theta$

a. $x^2 + (y - 3)^2 = 9$

b. $y = -6x$

c. $y = x - 3$

d. $(x - 3)^2 + y^2 = 9$

Write each equation in rectangular form.

3. $\theta = \frac{5\pi}{6}$

a. $y = -x$

b. $y = \frac{\sqrt{3}}{3}x$

c. $y = -\frac{\sqrt{3}}{3}x$

d. $y = -\sqrt{3}x$

4. Find a pair of polar coordinates for the point with rectangular coordinates $(-7, 7\sqrt{3})$.

a. $(7, \frac{2\pi}{3})$

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

c. $(14, \frac{2\pi}{3})$

d. $(\frac{2\pi}{3}, 14)$

Write each polar equation in rectangular form.

5. $r = \frac{3}{1 - \sin \theta}$

a. $x^2 = -6(y - 1.5)$

b. $x^2 = 6(y + 1.5)$

c. $y^2 = 6(x + 1.5)$

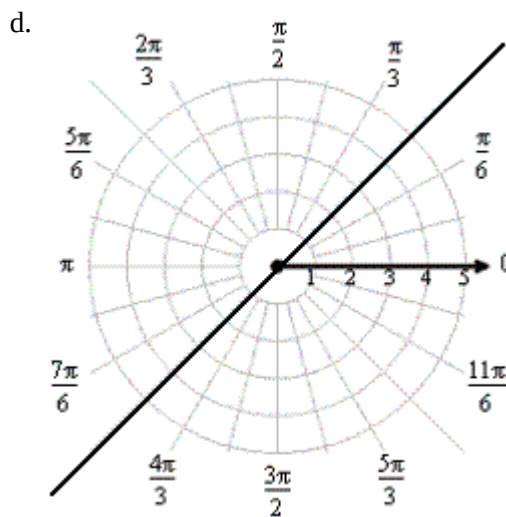
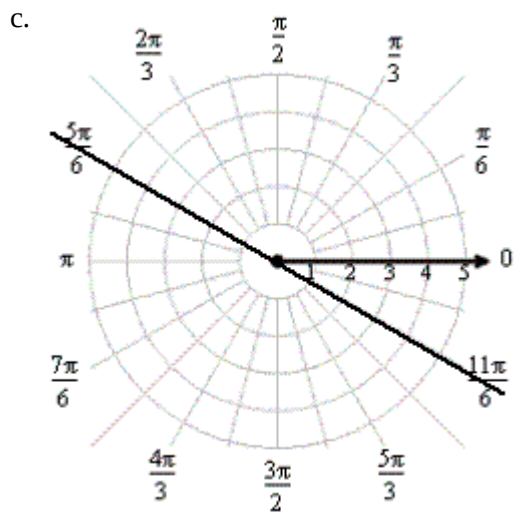
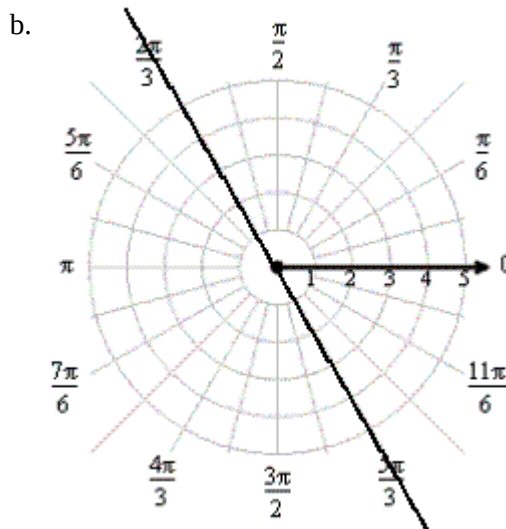
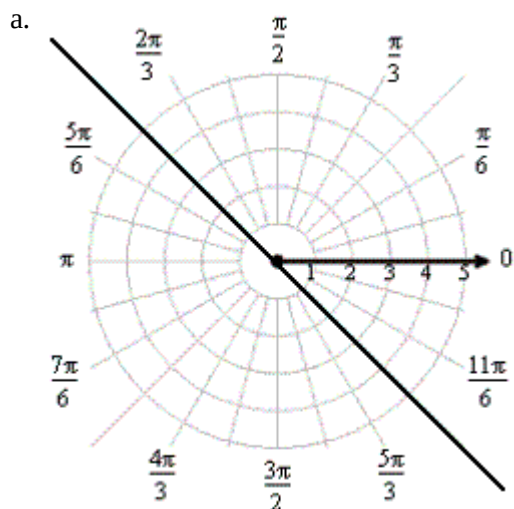
d. $y^2 = -6(x - 1.5)$

Precalculus G11_Ch9_Qs. bank

6. Find the distance between $P_1(1, -91^\circ)$ and $P_2(3, 335^\circ)$ on the polar plane.

- a. 1.249 b. 5.149
c. 4.149 d. 2.749

7. Graph the polar equation $\theta = -\frac{5\pi}{4}$



8. Determine the maximum r -values of $r = 2 \cos 3\theta$.

- a. $\theta = 0, \frac{2\pi}{3}, \frac{4\pi}{3}, 2\pi$ b. $\theta = \frac{\pi}{3}, \frac{2\pi}{3}$
c. $\theta = 0, \pi$ d. $\theta = 0, \frac{\pi}{3}, \frac{2\pi}{3}, \pi$

Precalculus G11_Ch9_Qs.bank

Write each equation in rectangular form.

9. $\theta = \frac{3\pi}{4}$

a. $y = x$

b. $y = -\frac{\sqrt{3}}{3}x$

c. $y = -\sqrt{3}x$

d. $y = -x$

Determine the symmetry of each function.

10. $r = 10 - 15 \sin \theta$

a. symmetric with respect to the line $\theta = \frac{3\pi}{2}$

b. symmetric with respect to the line $\theta = \frac{\pi}{2}$

c. symmetric with respect to the line $\theta = \pi$

d. symmetric with respect to the pole

11. Find a pair of polar coordinates for the point with rectangular coordinates (5, -5).

a. $(5\sqrt{2}, \frac{7\pi}{4})$

b. $(5, \frac{7\pi}{4})$

c. $(-5\sqrt{2}, \frac{7\pi}{4})$

d. $(\frac{7\pi}{4}, 5\sqrt{2})$

Write a polar equation for the conic with the given characteristics.

12. $e = 0.7$; vertices at (0, 13.6) and (0, -2.4)

a. $r = \frac{-4.08}{1 + 0.7 \cos \theta}$

b. $r = \frac{-4.08}{1 - 0.7 \sin \theta}$

c. $r = \frac{-4.08}{1 - 0.7 \cos \theta}$

d. $r = \frac{-4.08}{1 + 0.7 \sin \theta}$

Write each polar equation in rectangular form.

13. $r = \frac{1}{1 - \cos \theta}$

a. $x^2 = 2(y + 0.5)$

b. $x^2 = -2(y - 0.5)$

c. $y^2 = 2(x + 0.5)$

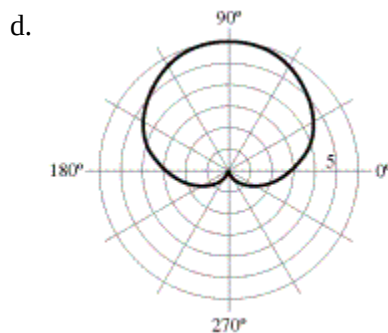
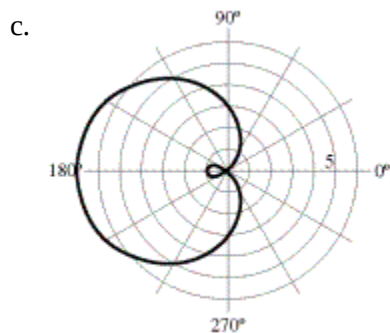
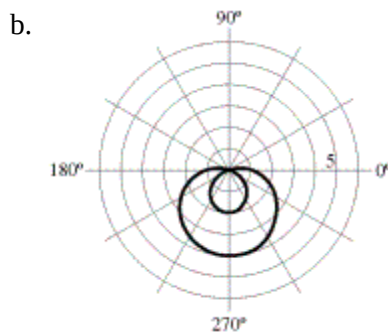
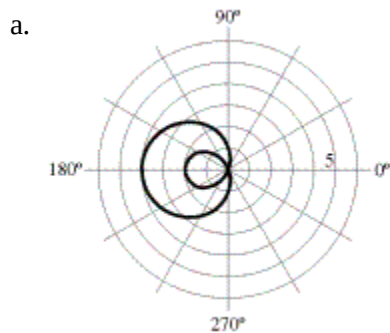
d. $y^2 = -2(x - 0.5)$

Precalculus G11 Ch9 Qs. bank

14. Determine the maximum r -values of $r = 7 \cos 4\theta$.

- a. $\theta = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$ b. $\theta = 0, \frac{\pi}{4}, \frac{3\pi}{4}, \pi$
 c. $\theta = 0, \frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \pi$ d. $\theta = \frac{\pi}{2}$

15. Graph the polar equation $r = 1 - 3 \sin \theta$.



Write each polar equation in rectangular form.

16. $r = \frac{1.8}{1 + 0.3 \cos \theta}$

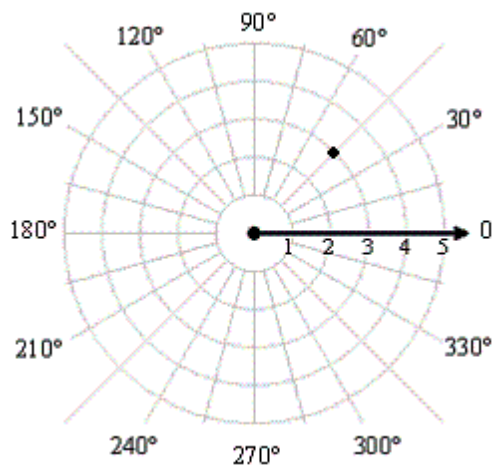
- a. $\frac{(x - 2.57)^2}{3.91} + \frac{y^2}{3.56} = 1$ b. $\frac{x^2}{6.61} + \frac{(y - 2.57)^2}{6.61} = 1$
 c. $\frac{x^2}{1.38} + \frac{(y - 1.38)^2}{1.92} = 1$ d. $\frac{(x - 1.38)^2}{3.91} + \frac{y^2}{3.56} = 1$

Precalculus G11 Ch9 Qs. bank

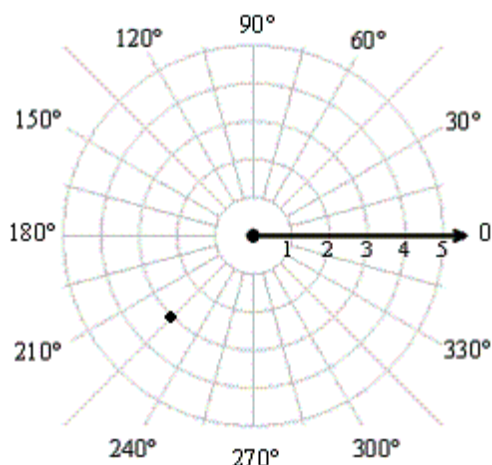
Graph each point on a polar grid.

17. $R(-3, -135^\circ)$

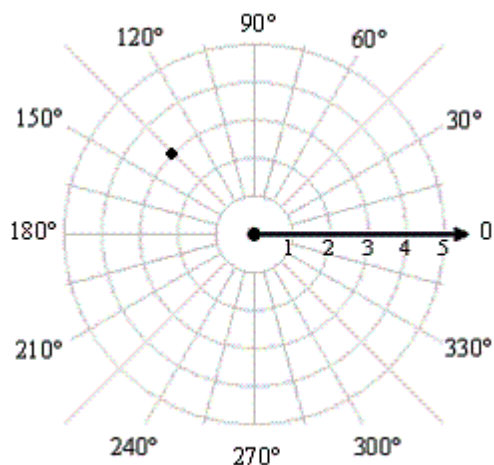
a.



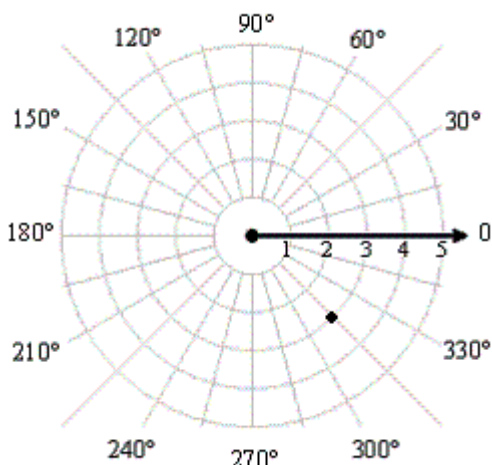
b.



c.



d.



18. Find the rectangular coordinates of $(3, 30^\circ)$.

- a. $\left(\frac{3\sqrt{3}}{2}, -\frac{3}{2}\right)$ b. $\left(\frac{3\sqrt{3}}{2}, \frac{3}{2}\right)$
 c. $\left(-\frac{3\sqrt{3}}{2}, \frac{3}{2}\right)$ d. $\left(-\frac{3\sqrt{3}}{2}, -\frac{3}{2}\right)$

Precalculus G11 Ch9 Qs. bank

Identify the type of curve given by each equation.

19. $r = 5\theta + 1$

- a. Limacon b. Lemniscate
c. Spiral of Archimedes d. Rose

20. Determine the polar form of the complex number $5 - 3i$. Express the angle θ in degrees, where $0 \leq \theta \leq 360^\circ$, and round numerical entries in the answer to two decimal places.

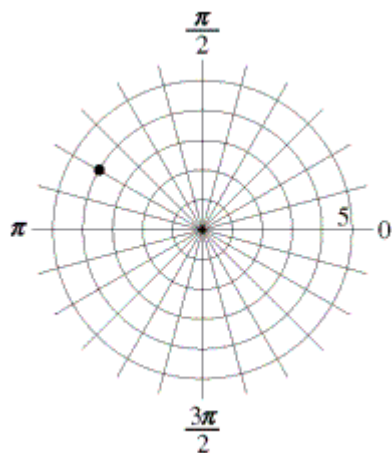
- a. $329.04(\cos 5.83 + i\sin 5.83^\circ)$ b. $5.83(\cos 329.04^\circ - i\sin 329.04^\circ)$
c. $5.83(\cos 329.04^\circ + i\sin 329.04^\circ)$ d. $329.04(\cos 329.04^\circ - i\sin 329.04^\circ)$

Write each polar equation in rectangular form.

21. $r = \frac{1}{1 - \sin \theta}$

- a. $y^2 = 2(x + 0.5)$ b. $x^2 = -2(y - 0.5)$
c. $x^2 = 2(y + 0.5)$ d. $y^2 = -2(x - 0.5)$

22. Name the polar coordinates of the point graphed below.



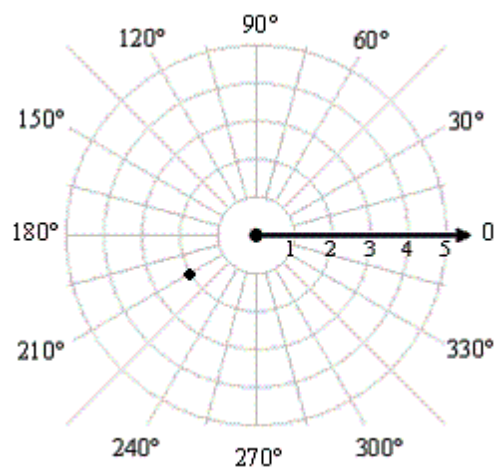
- a. $\left(4, \frac{5\pi}{6}\right)$ b. $\left(5, \frac{5\pi}{6}\right)$
c. $\left(4, \frac{5\pi}{7}\right)$ d. $\left(5, \frac{5\pi}{7}\right)$

Precalculus G11 Ch9 Qs. bank

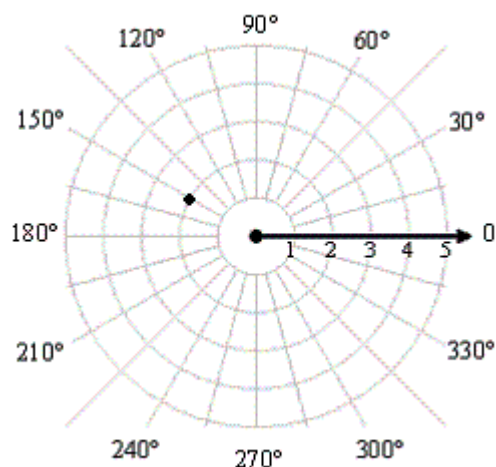
Graph each point on a polar grid.

23. $R(-2, -330^\circ)$

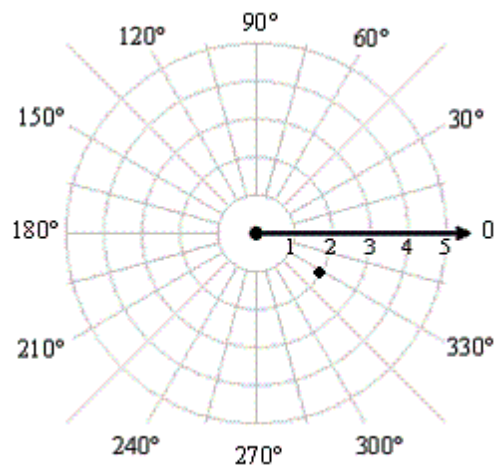
a.



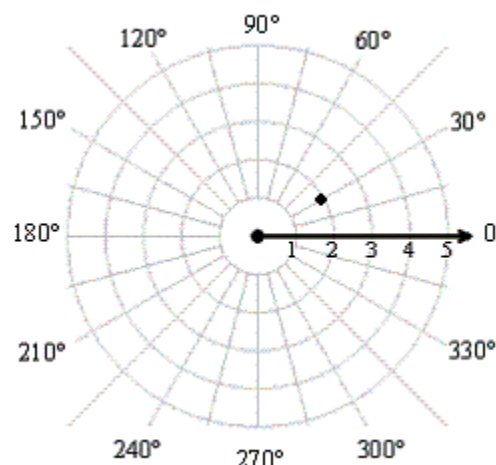
b.



c.



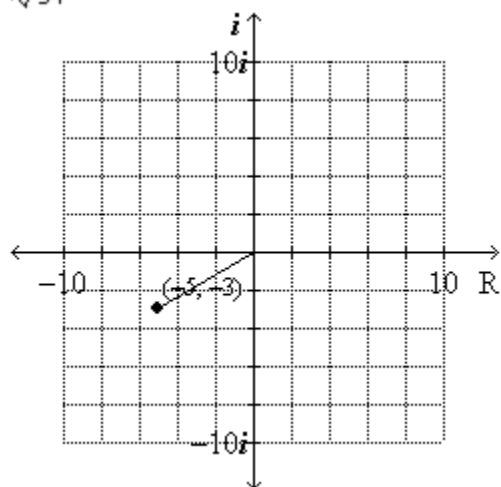
d.



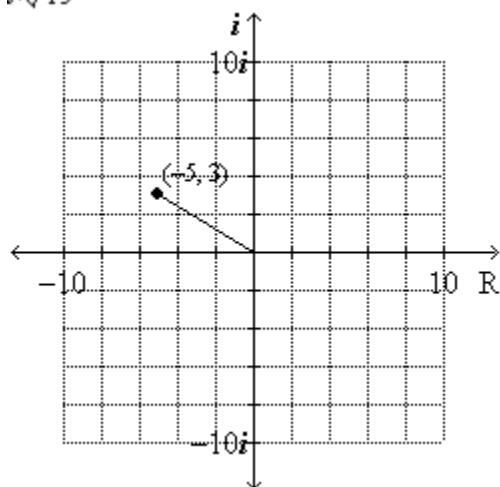
Precalculus G11 Ch9 Qs. bank

24. Graph the number $-5 + 3i$ in the complex plane and find its absolute value.

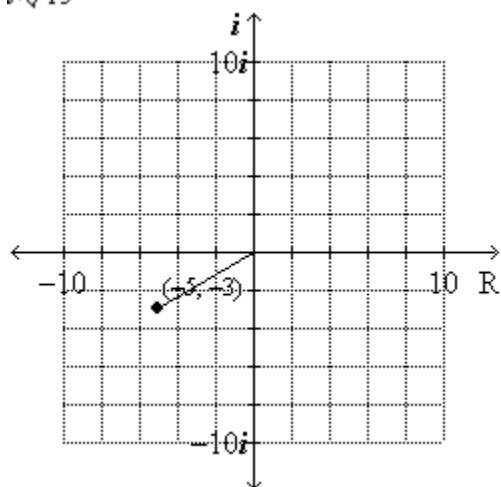
a. $\sqrt{34}$



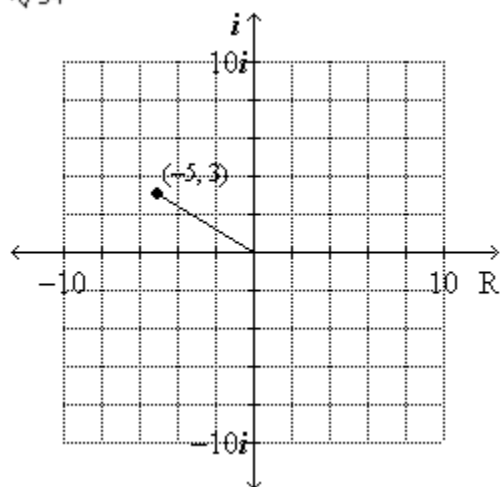
b. $i\sqrt{15}$



c. $i\sqrt{15}$



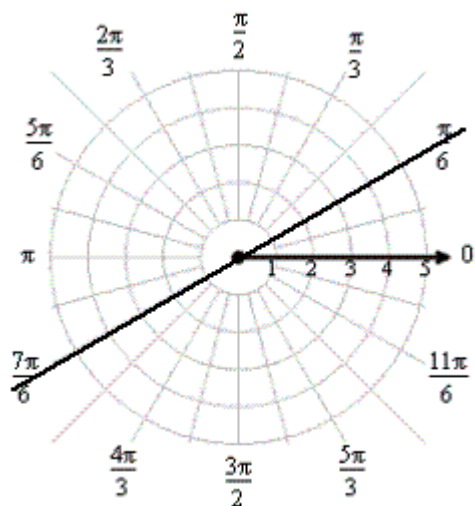
d. $\sqrt{34}$



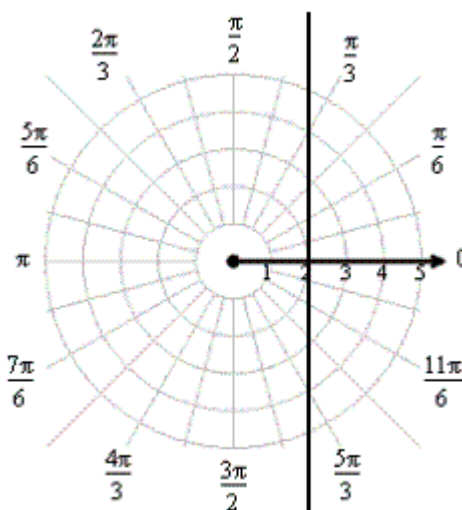
Precalculus G11_Ch9_Qs. bank

25. Graph the polar equation $r = 2$.

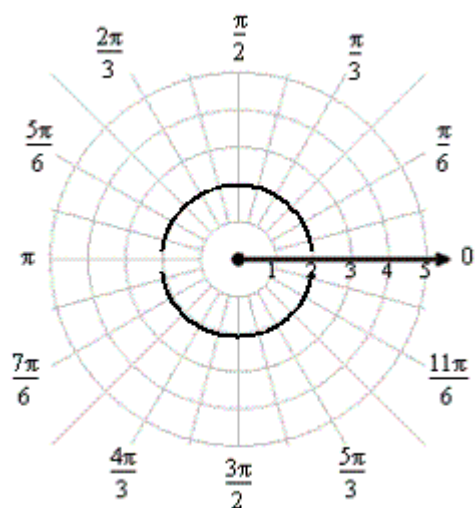
a.



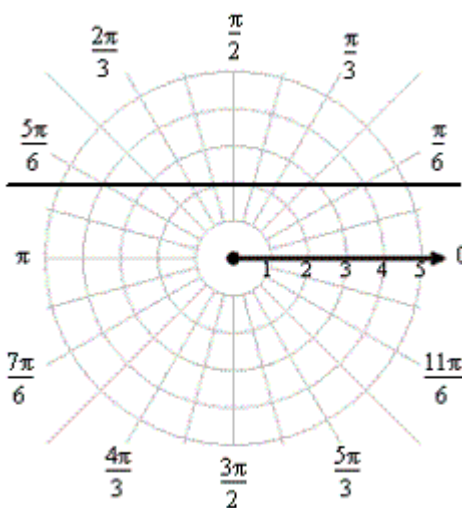
b.



c.

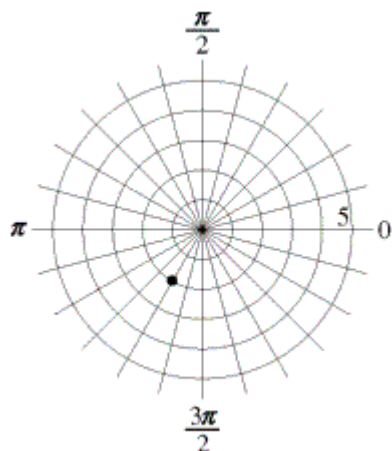


d.



Precalculus G11 Ch9 Qs. bank

26. Name the polar coordinates of the point graphed below.



- a. $\left(2, \frac{4\pi}{3}\right)$ b. $\left(2, \frac{4\pi}{4}\right)$
 c. $\left(3, \frac{4\pi}{3}\right)$ d. $\left(3, \frac{4\pi}{4}\right)$

27. Find the rectangular coordinates of $(9, 150^\circ)$.

- a. $\left(-\frac{9\sqrt{3}}{2}, -\frac{9}{2}\right)$ b. $\left(\frac{9\sqrt{3}}{2}, -\frac{9}{2}\right)$
 c. $\left(-\frac{9\sqrt{3}}{2}, \frac{9}{2}\right)$ d. $\left(\frac{9\sqrt{3}}{2}, \frac{9}{2}\right)$

28. Determine the equation of the directrix of $r = \frac{-3.6}{6 + 0.6 \sin \theta}$.

- a. $y = 6$ b. $y = -6$
 c. $x = -6$ d. $y = -6$

Write a polar equation for the conic with the given characteristics.

29. $e = 1.4$; directrix: $x = -4$

- a. $r = \frac{5.6}{1 - 1.4 \cos \theta}$ b. $r = \frac{4}{1 - 1.4 \cos \theta}$
 c. $r = \frac{5.6}{1 - 1.4 \sin \theta}$ d. $r = \frac{4}{1 - 1.4 \sin \theta}$

Precalculus G11_Ch9_Qs. bank

Write each polar equation in rectangular form.

30. $r = \frac{2.1}{1 + 0.7 \sin \theta}$

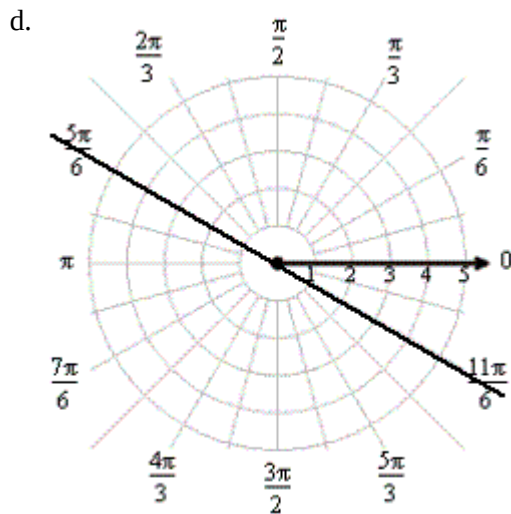
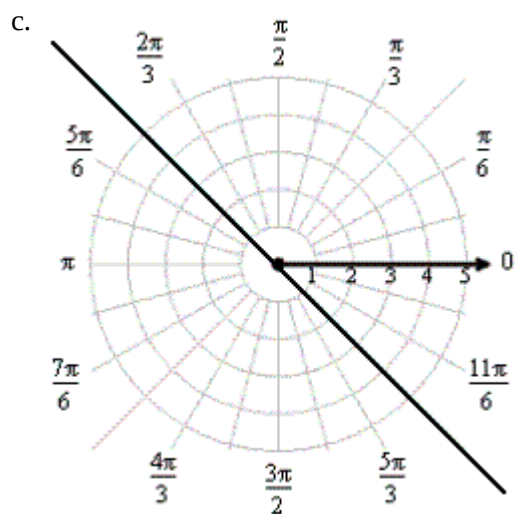
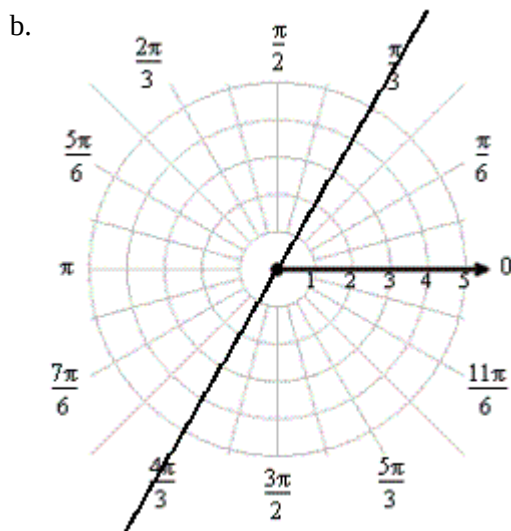
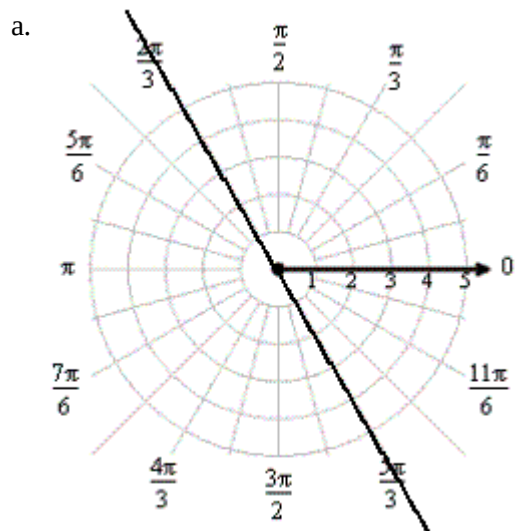
a. $\frac{x^2}{1.24} + \frac{(y - 1.24)^2}{1.53} = 1$

b. $\frac{x^2}{49} + \frac{(y - 7)^2}{49} = 1$

c. $\frac{(x - 1.24)^2}{16.96} + \frac{y^2}{8.65} = 1$

d. $\frac{(x - 7)^2}{16.96} + \frac{y^2}{8.65} = 1$

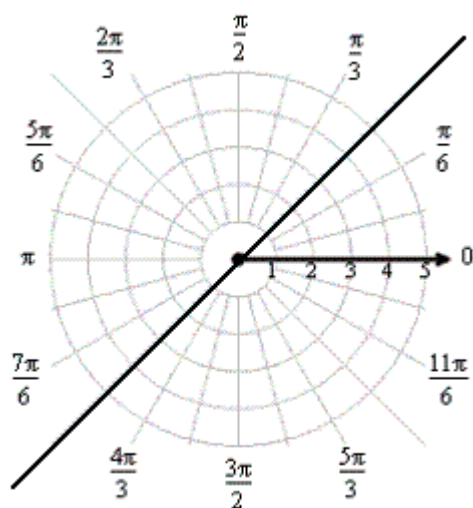
31. Graph the polar equation $\theta = -\frac{\pi}{3}$



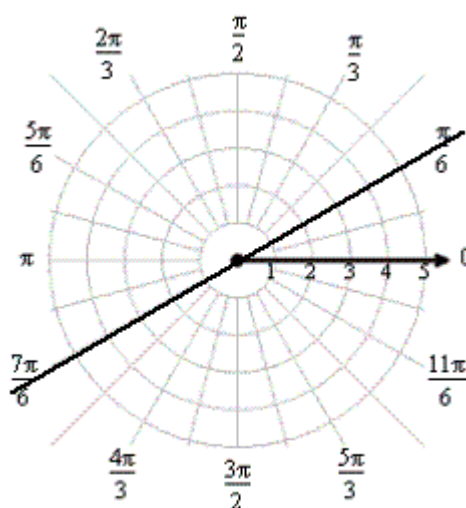
Precalculus G11 Ch9 Qs. bank

32. Graph the polar equation $\theta = -\frac{2\pi}{3}$

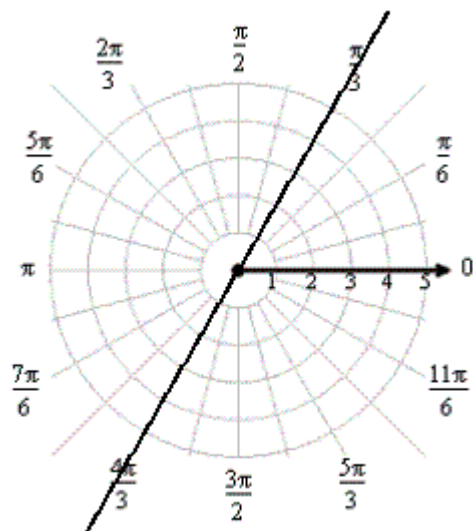
a.



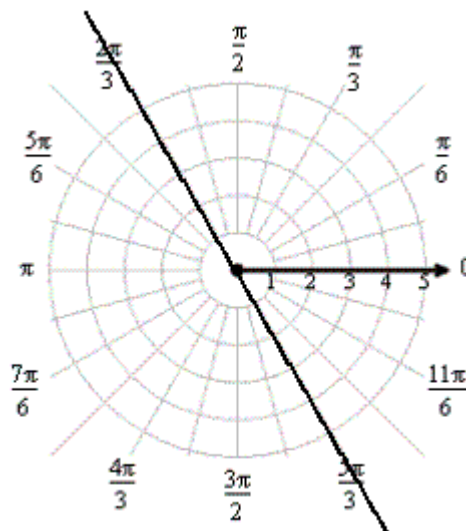
b.



c.



d.



Determine the symmetry of each function.

33. $r = 8 - 12 \sin \theta$

- symmetric with respect to the line $\theta = \frac{\pi}{2}$
- symmetric with respect to the line $\theta = \frac{3\pi}{2}$
- symmetric with respect to the pole
- symmetric with respect to the line $\theta = \pi$

Precalculus G11 Ch9 Qs. bank

Write a polar equation for the conic with the given characteristics.

34. $e = 1.6$; directrix: $y = 4$

a. $r = \frac{4}{1 + 1.6 \sin \theta}$ b. $r = \frac{6.4}{1 + 1.6 \cos \theta}$

c. $r = \frac{4}{1 + 1.6 \cos \theta}$ d. $r = \frac{6.4}{1 + 1.6 \sin \theta}$

Write each equation in rectangular form.

35. $\theta = \frac{4\pi}{3}$

a. $y = x$ b. $y = \sqrt{3}x$

c. $y = \frac{\sqrt{3}}{3}x$ d. $y = -\sqrt{3}x$

36. Find $(-5 + i)^5$. Express the result in rectangular form.

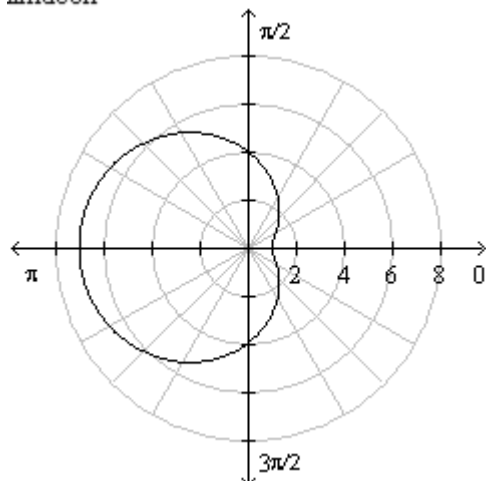
a. $-2876 + 1900i$ b. $1900 - 2876i$

c. $-3125 + i$ d. $-1024i$

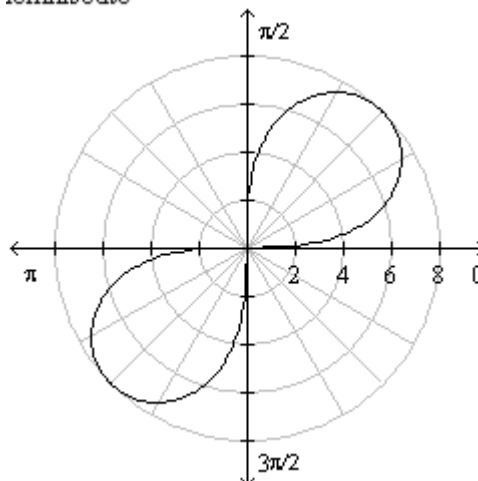
Precalculus G11 Ch9 Qs. bank

37. Identify the graph and type of curve for $r^2 = 64 \cos 2\theta$

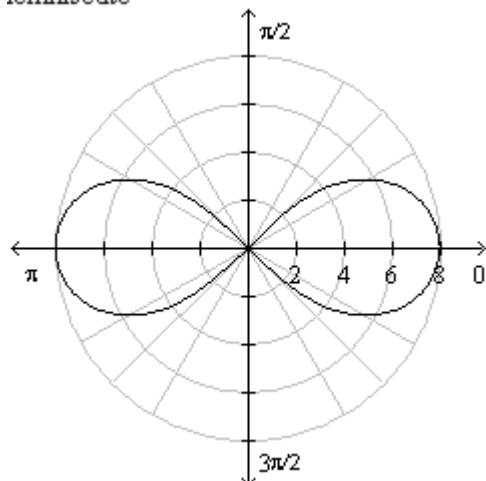
a. limaçon



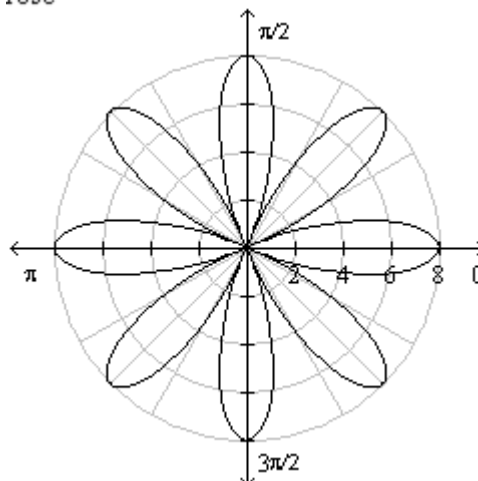
b. lemniscate



c. lemniscate



d. rose



38. Find the rectangular coordinates of $(5, 30^\circ)$.

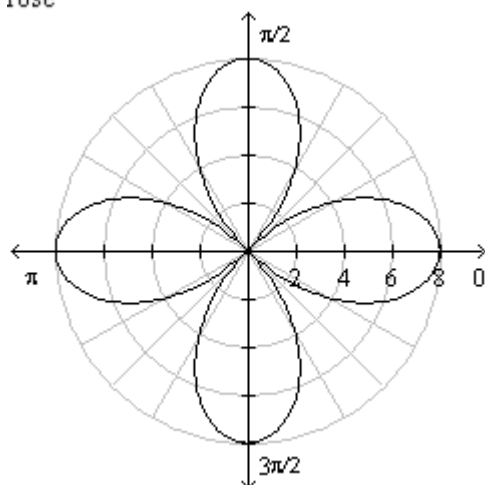
a. $\left(\frac{5\sqrt{3}}{2}, \frac{5}{2}\right)$ b. $\left(-\frac{5\sqrt{3}}{2}, -\frac{5}{2}\right)$

c. $\left(\frac{5\sqrt{3}}{2}, -\frac{5}{2}\right)$ d. $\left(-\frac{5\sqrt{3}}{2}, \frac{5}{2}\right)$

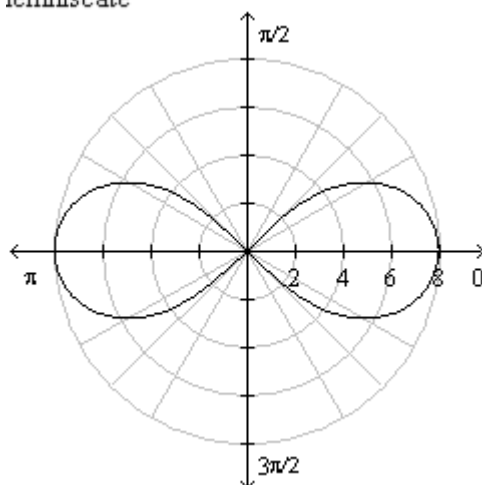
Precalculus G11 Ch9 Qs. bank

39. Identify the graph and type of curve for $r^2 = 64 \cos 2\theta$

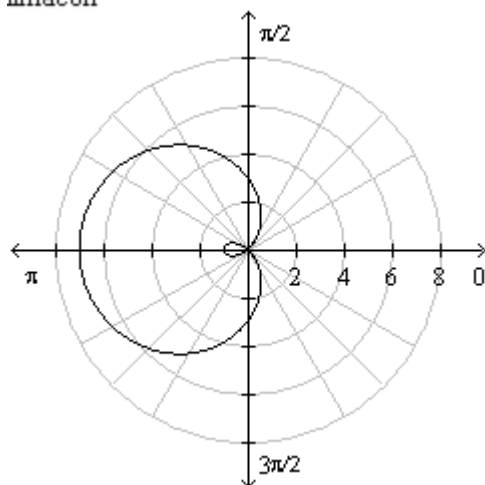
a. rose



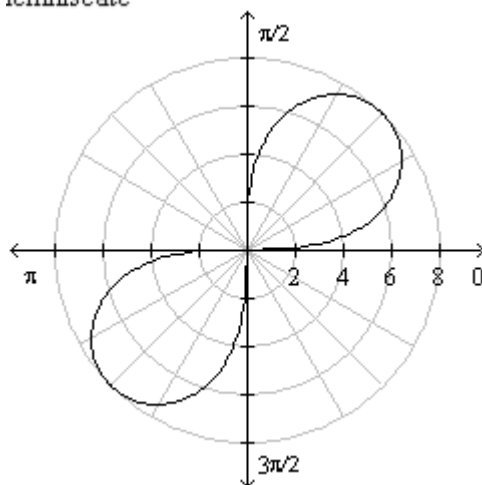
b. lemniscate



c. limaçon



d. lemniscate

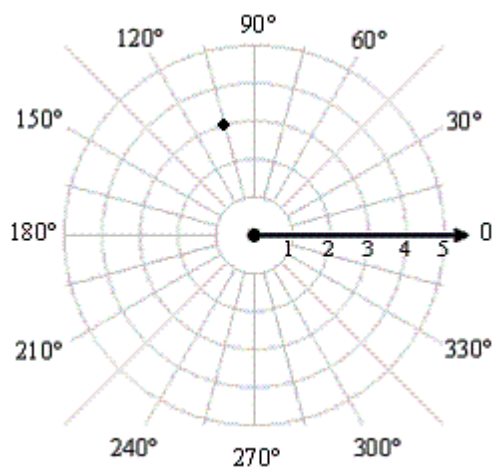


Precalculus G11 Ch9 Qs. bank

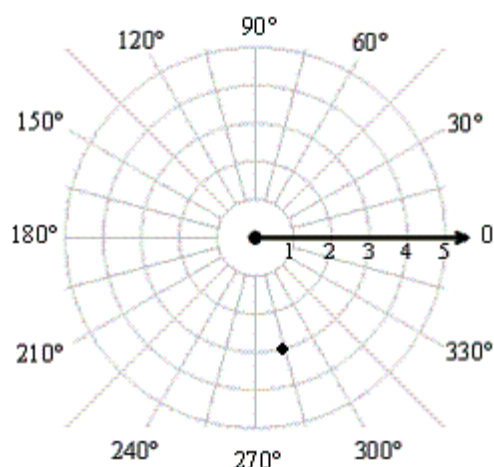
Graph each point on a polar grid.

40. $R(3, -255^\circ)$

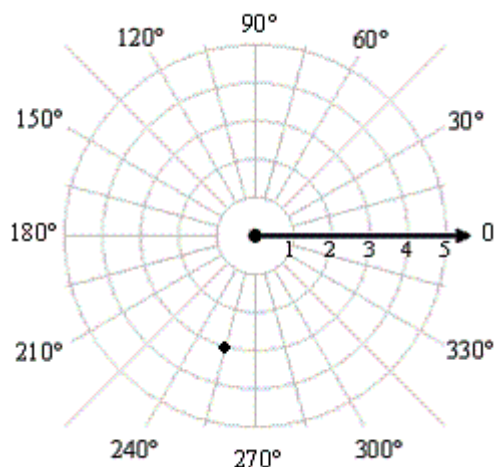
a.



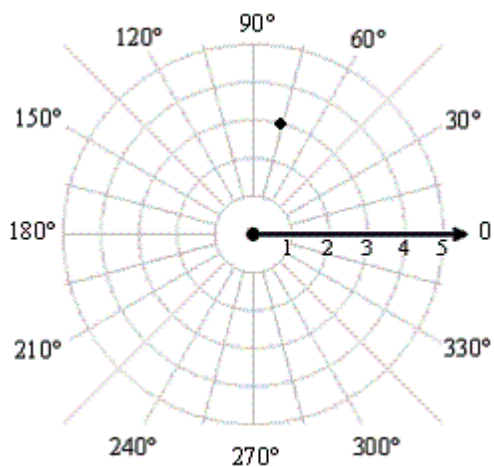
b.



c.



d.



41. Determine the zeros of $r = 8 \sin 3\theta$.

a. $\theta = 0, \frac{\pi}{3}, \frac{2\pi}{3}$

b. $\theta = 0, \frac{\pi}{3}$

c. $\theta = 0, \frac{2\pi}{3}$

d. $\theta = \frac{\pi}{3}, \frac{2\pi}{3}$

Precalculus G11 Ch9 Qs. bank

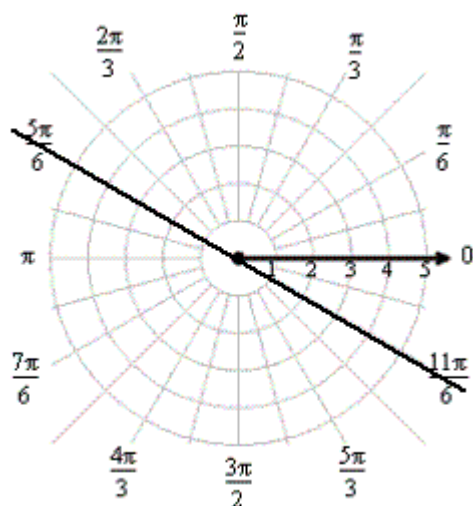
Identify the type of curve given by each equation.

42. $r = -12\sin 2\theta$

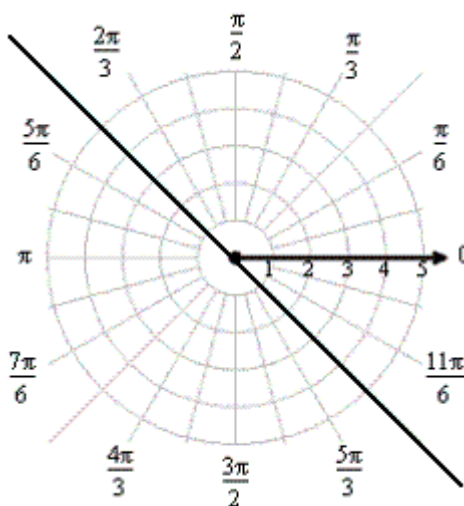
- a. Rose b. Circle
c. Spiral of Archimedes d. Limacon

43. Graph the polar equation $\theta = -\frac{\pi}{6}$

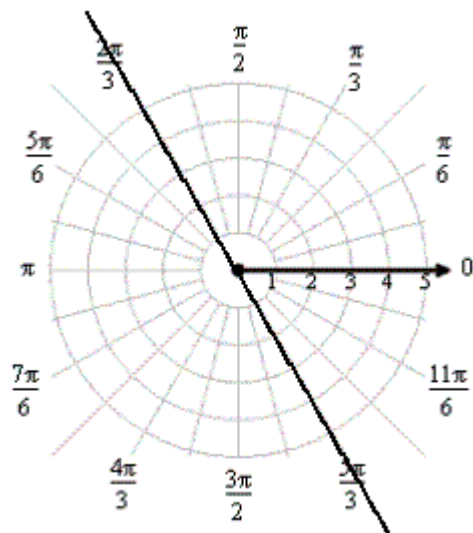
a.



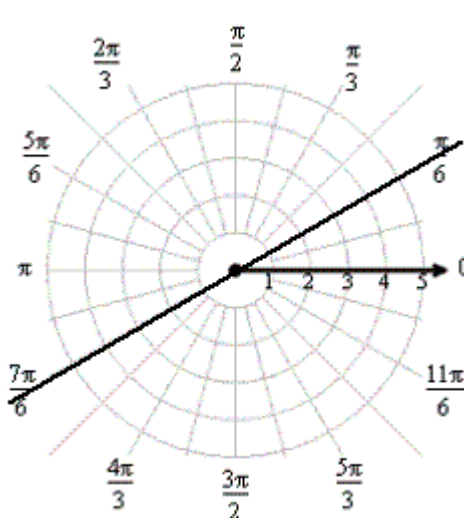
b.



c.



d.



Precalculus G11 Ch9 Qs. bank

Determine the symmetry of each function.

44. $r = 9 + 4 \sin \theta$

- a. symmetric with respect to the line $\theta = \frac{\pi}{2}$
- b. symmetric with respect to the polar axis
- c. symmetric with respect to the pole
- d. symmetric with respect to the line $\theta = \frac{3\pi}{2}$

Write a polar equation for the conic with the given characteristics.

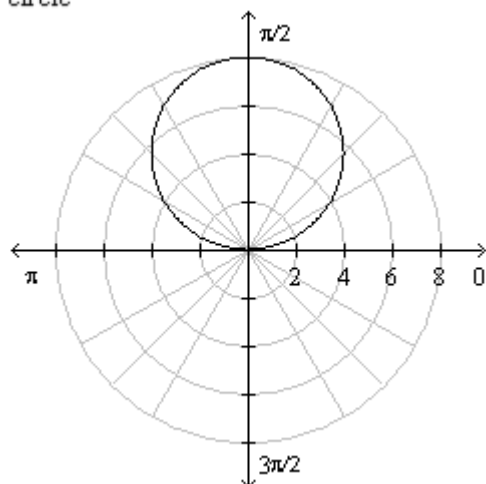
45. $e = 1.6$; vertices at $(-15.6, 0)$ and $(-3.6, 0)$

- a. $r = \frac{-9.36}{1 + 1.6 \cos \theta}$
- b. $r = \frac{-9.36}{1 + 1.6 \sin \theta}$
- c. $r = \frac{-9.36}{1 - 1.6 \sin \theta}$
- d. $r = \frac{-9.36}{1 - 1.6 \cos \theta}$

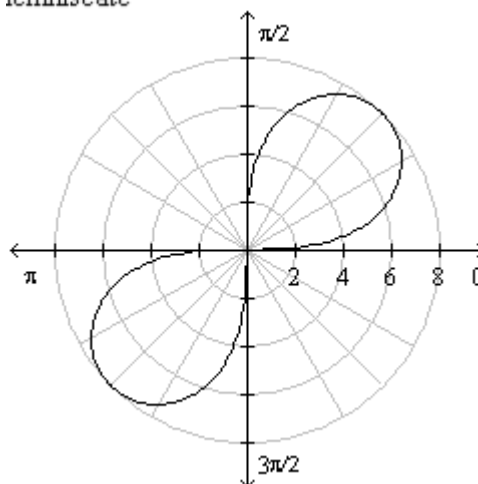
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46. Identify the graph and type of curve for $r = 8 \sin 4\theta$

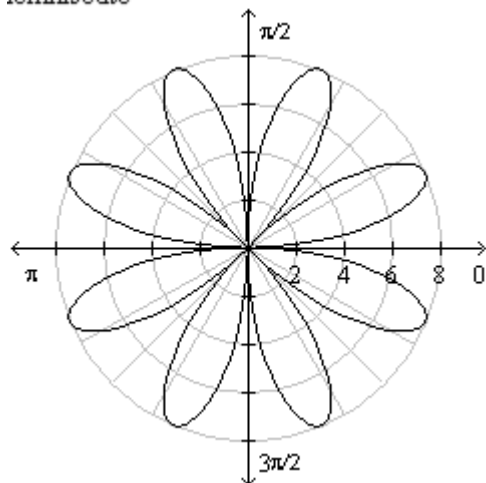
a. circle



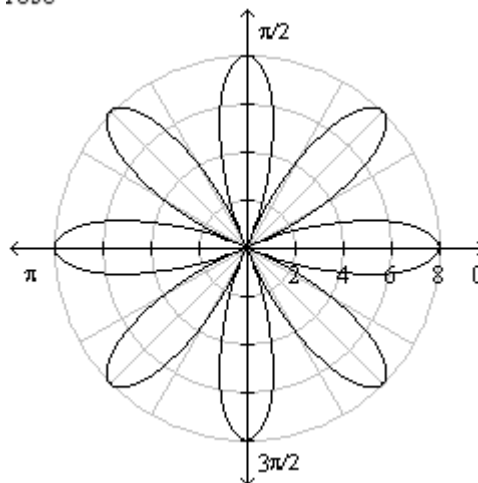
b. lemniscate



c. lemniscate



d. rose



Write each polar equation in rectangular form.

47. $r = \frac{4}{1 + \sin \theta}$

a. $x^2 = -8(y - 2)$ b. $x^2 = 8(y + 2)$

c. $y^2 = -8(x - 2)$ d. $y^2 = 8(x + 2)$

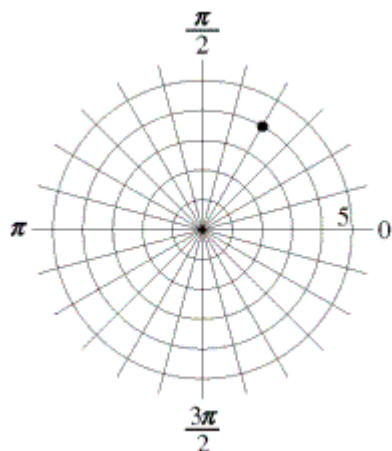
48. Find $(-2 - 2i)^4$. Express the result in rectangular form.

a. $1.57 + 2.35i$ b. $0.72 + 1.08i$

c. $1.08 + 0.72i$ d. $0.93 + 1.40i$

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49. Name the polar coordinates of the point graphed below.



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

Determine the symmetry of each function.

50. $r = 10 - 9 \cos \theta$

- a. symmetric with respect to the line $\theta = \frac{3\pi}{2}$
 b. symmetric with respect to the polar axis
 c. symmetric with respect to the pole
 d. symmetric with respect to the line $\theta = \pi$

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Precalculus G11 Ch9 Qs. bank

Answer Key

1. a
2. a
3. c
4. c
5. b
6. d
7. a
8. d
9. d
10. a
11. a
12. c
13. c
14. c
15. b
16. d
17. a
18. b
19. c
20. c
21. c
22. a
23. a
24. d
25. c

Name: _____ Class: _____ Date: _____

Precalculus G11 Ch9 Qs. bank

26. a

27. c

28. b

29. a

30. a

31. a

32. c

33. b

34. d

35. b

36. b

37. c

38. a

39. b

40. a

41. a

42. a

43. a

44. a

45. a

46. c

47. a

48. b

49. c

50. d