

For #17-18, write the following complex numbers in polar form.

17. $z = -2\sqrt{3} + 2i$

18. $z = 1 + i$

For #19-20, find the product, $z_1 z_2$, and quotient, $\frac{z_1}{z_2}$.

19. $z_1 = 3(\cos 40^\circ + i \sin 40^\circ)$

20. $z_1 = 7\left(\cos \frac{\pi}{2} + i \sin \frac{\pi}{2}\right)$

$z_2 = 5(\cos 70^\circ + i \sin 70^\circ)$

$z_2 = 4\left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}\right)$

For #21-22, use DeMoivre's Theorem to find the indicated power in rectangular form.

21. $[2(\cos 10^\circ + i \sin 10^\circ)]^3$

22. $(-1 + i)^5$

For #23-24, use DeMoivre's Theorem to find the indicated complex root.

23. Find the complex square roots of $25(\cos 210^\circ + i \sin 210^\circ)$ in polar form.

24. Find the complex cube roots of $8i$ in rectangular form.

For #25-26, sketch the vector and find its magnitude.

25. $v = 2i + 3j$

26. $v = -5i - 3j$

27. Given the initial point $P_1 = (-4, -4)$ and terminal point $P_2 = (6, 2)$ of a vector v . Write v in terms of i and j .

28. Given $u = 2i - 5j$ and $v = 3i + 7j$, find the following.

a. $3u + v$

b. $\|v - u\|$

29. The magnitude and direction angle of v are $\|v\| = 10$ and $\theta = 30^\circ$. Write v in terms of i and j .

30. A child pulls a sled along level ground by exerting a force of 30 pounds on a handle that makes an angle of 45° with the ground. Find the vector described in terms of i and j .

31. The jet stream is blowing at 60 miles per hour in the direction of N 45° W. Express its velocity as a vector v in terms of i and j .

Solve each triangle below.

32. $C = 42^\circ$, $a = 16$, $c = 13$ **33.** $a = 5$, $b = 7.2$, $c = 10.1$ **34.** $A = 42^\circ$, $a = 63$, $b = 57$

35. $B = 65^\circ$, $a = 7$, $b = 6$ **36.** $A = 60^\circ$, $b = 20$, $c = 30$

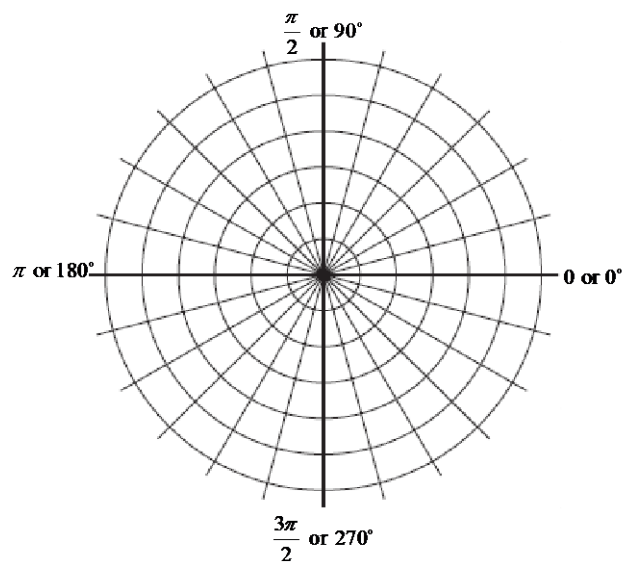
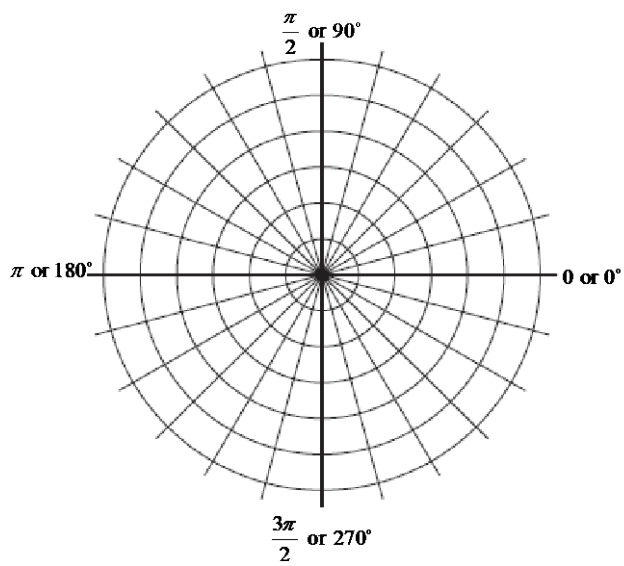
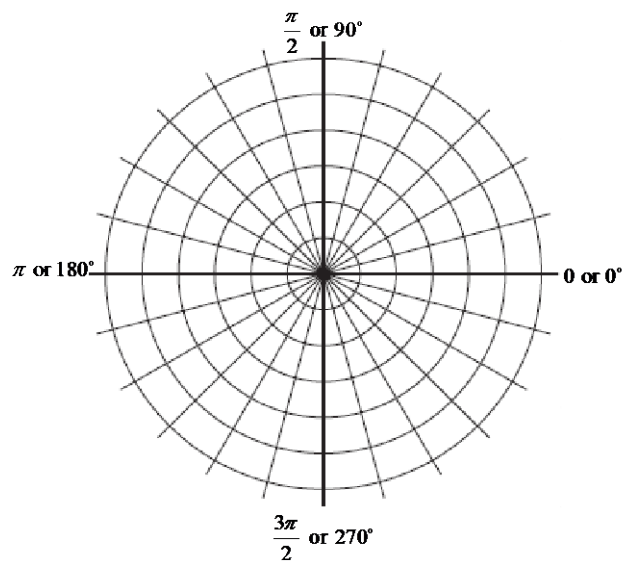
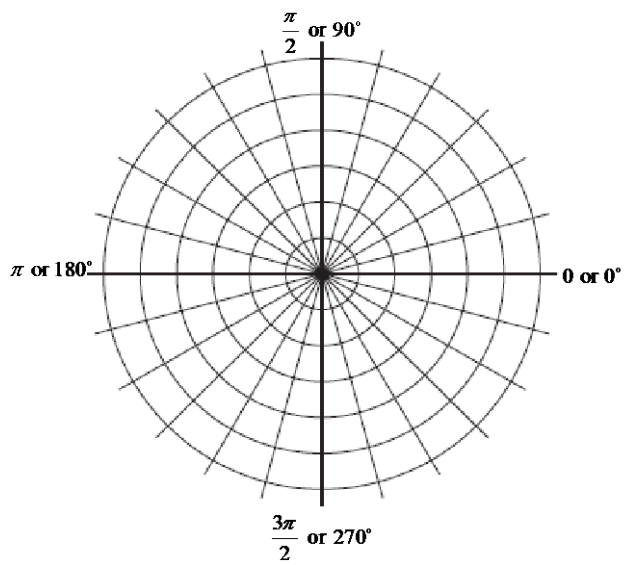
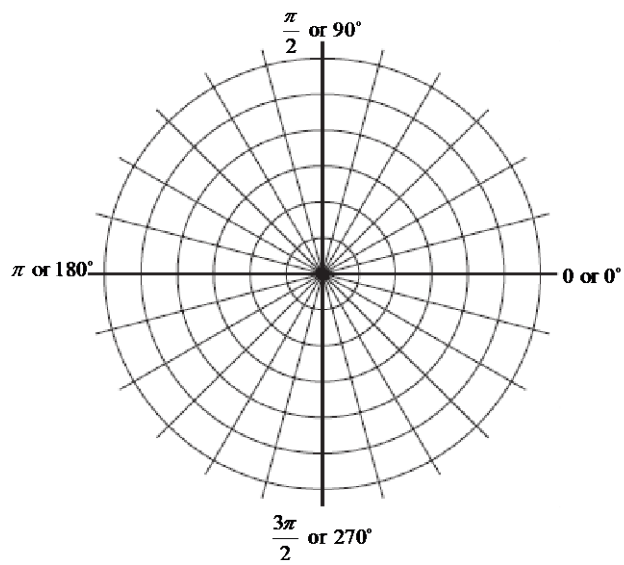
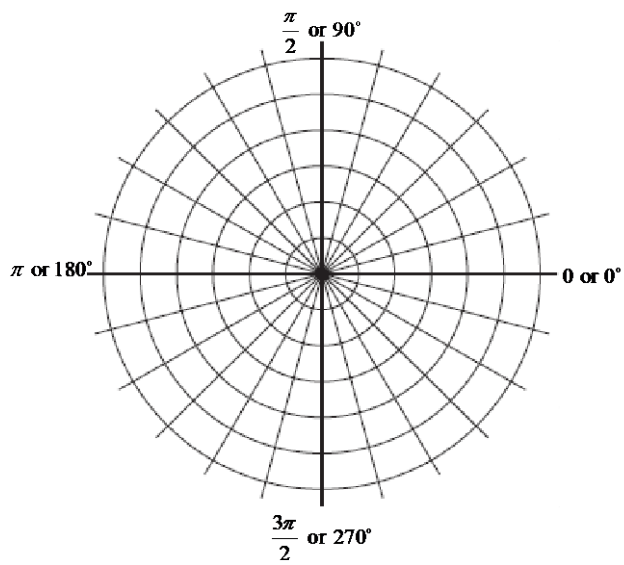
37. Find the area of a triangle with $C = 36^\circ$, $a = 5$ ft, $b = 7$ ft

38. Find the area of a triangle with $a = 24$ yd., $b = 31$ yd., $c = 47$ yd.

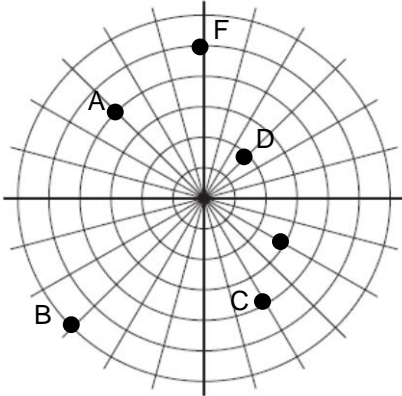
39. Two fire-lookout stations are 16 miles apart, with station B directly east of station A. Both stations spot a fire on a mountain to the south. The bearing from station A to the fire is S 36° E. The bearing from station B to the fire is S 23° W. How far is the fire from station A?

40. Two trains leave a station on different tracks that make an angle of 110° with the station as vertex. The first train travels at an average rate of 50 mph and the second train travels at an average rate of 40 mph. How far apart are the trains after 2 hours?

41. A plane leaves airport A and travels 580 miles to airport B on a bearing of N 34° E. The plane later leaves airport B and travels to airport C 400 miles away on a bearing of S 74° E. Find the distance from airport A to airport C.



1.



2a. $\left(3, \frac{13\pi}{6}\right)$ b. $\left(-3, \frac{7\pi}{6}\right)$ c. $\left(3, \frac{-11\pi}{6}\right)$

3. $\left(3\sqrt{2}, \frac{7\pi}{4}\right)$ 4. $\left(10, \frac{7\pi}{6}\right)$ 5. (0, 6)

6. $\left(\frac{-3\sqrt{3}}{2}, \frac{3}{2}\right)$ 7. $r = \frac{8}{2\cos\theta + 3\sin\theta}$

8. $r = 12\cos\theta$ 9. $x^2 + y^2 = 9$

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

13. rose – 3 petals

16. circle

18. $z = \sqrt{2}\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)$

19. $z_1 z_2 = 15(\cos 110^\circ + i\sin 110^\circ)$

20. $z_1 z_2 = 28\left(\cos\frac{5\pi}{6} + i\sin\frac{5\pi}{6}\right)$

21. $z = 4\sqrt{3} + 4i$

23. $5(\cos 105^\circ + i\sin 105^\circ)$ and $5(\cos 285^\circ + i\sin 285^\circ)$

24. $\sqrt{3} + i, -\sqrt{3} + i, -2i$

26. $\|v\| = \sqrt{34}$

28a. $3u + v = 9i - 8j$

29. $v = 5\sqrt{3}i + 5j$

31. $v = -30\sqrt{2}i + 30\sqrt{2}j$

32. Two triangles: $A = 55^\circ, B = 83^\circ, b = 19.3$ or $A = 125^\circ, B = 13^\circ, b = 4.4$

33. $A = 28^\circ, B = 42^\circ, C = 110^\circ$ 34. $B = 37^\circ, C = 101^\circ, c = 92.4$ 35. no triangle

36. $a = 26.5, B = 41^\circ, C = 79^\circ$ 37. 10 ft^2 38. 332 yd^2

39. 17 miles 40. 148 miles 41. 800 miles