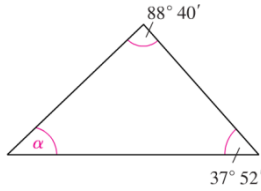
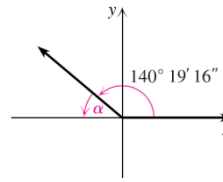


Find the degree measure of angle α without using a calculator.

23.



24.



Draw the angle in standard position and name the quadrant in which its terminal side lies.

25. $\frac{5\pi}{12}$

26. $\frac{10\pi}{3}$

27. $-\frac{3\pi}{7}$

28. $-\frac{11\pi}{6}$

29. -7.3

30. 30

Convert each degree measure to radian measure without a calculator. Give exact answers (in terms of π).

31. 240°

32. -10°

33. 450°

34. -30°

35. 225°

36. 200°

37. 330°

38. 15°

39. -80°

40. 72°

Convert each radian measure to degree measure without a calculator.

41. $\frac{7\pi}{6}$

42. $\frac{\pi}{3}$

43. $\frac{3\pi}{2}$

44. $-\frac{9\pi}{4}$

45. $-\frac{5\pi}{12}$

46. $\frac{5\pi}{18}$

47. $\frac{14\pi}{9}$

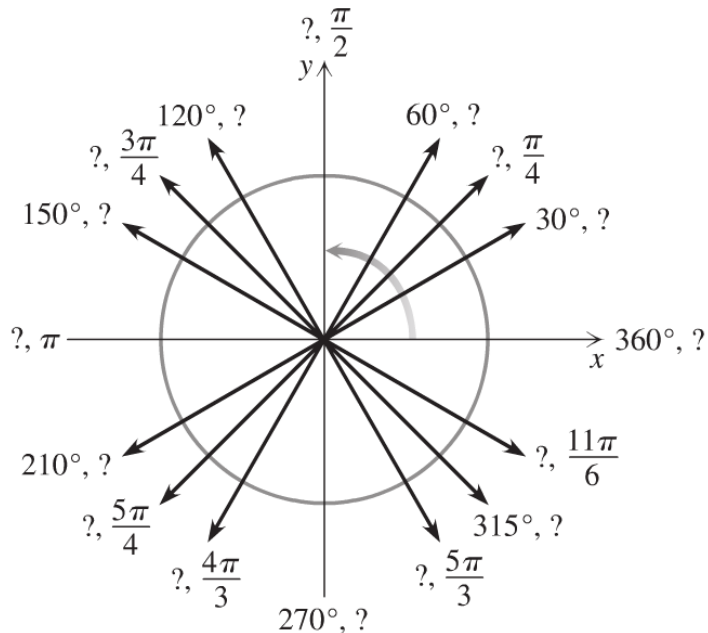
48. $\frac{\pi}{36}$

49. $-\frac{3\pi}{10}$

50. $\frac{7\pi}{5}$

Fill in the missing degree or radian measure for each position of the terminal side shown. Practice until you have memorized the degree and radian measures corresponding to these common angles!

51.



Find the radian measure for two positive and two negative angles that are coterminal with the given angle.

52. $\frac{5\pi}{6}$

53. $-\frac{7\pi}{4}$

54. 1.2

Determine if the given angles are coterminal.

55. $\frac{9\pi}{2}$ and $-\frac{\pi}{2}$

56. $\frac{5\pi}{6}$ and $\frac{41\pi}{6}$

Find the measure in radians of the smallest positive angle that is coterminal with each given angle. For angles given in terms of π , write the answer in terms of π . Otherwise, round to the nearest hundredth.

57. $\frac{9\pi}{2}$

58. $-\frac{13\pi}{3}$

59. 8.32

Find the length of the arc intercepted by the given central angle α in a circle of radius r . Round to the nearest tenth.

60. $\alpha = \pi/4$, $r = 12$ ft

61. $\alpha = 3^\circ$, $r = 26.1$ mi

Find the radius of the circle in which the given central angle α intercepts an arc of the given length s . Round to the nearest tenth.

62. $\alpha = 150^\circ$, $s = 10$ km

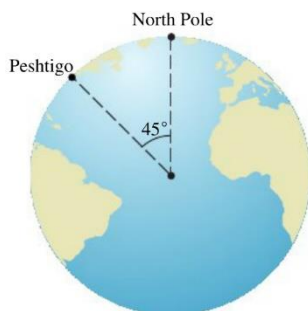
63. $\alpha = \pi/3$, $s = 7$ in

Find the exact area of the sector of the circle with the given radius and central angle.

64. $r = 6$ cm, $\alpha = 30^\circ$

65. $r = 8$ in, $\alpha = \pi/12$

66. Peshtigo, Wisconsin, is on the 45th parallel. This means that an arc from Peshtigo to the North Pole subtends a central angle of 45° as shown in the figure. If the radius of the earth is 3950 miles, then how far (to the nearest mile) is it from Peshtigo to the North Pole?



67. A central-pivot irrigation system is watering a circular field with a radius of 150 ft. The system rotates $\pi/6$ radians in one hour. What area (to the nearest square foot) is watered in one hour?

68. If a 16-inch-diameter pizza is cut into 6 slices of the same size, then what is the area of each slice to the nearest tenth of a square inch?