57. (a) $\frac{7\pi}{3} = \frac{7\pi}{3}\left(\frac{180^\circ}{\pi}\right) = 420^\circ$

(b) $-\frac{13\pi}{60} = -\frac{13\pi}{60}\left(\frac{180^\circ}{\pi}\right) = -39^\circ$

59. $126^\circ = 126\left(\frac{\pi}{180}\right) \approx 2.199$ radians

61. $-216.35^\circ = -216.35\left(\frac{\pi}{180}\right) \approx -3.776$ radians

63. $-0.78^\circ = -0.78\left(\frac{\pi}{180}\right) \approx -0.014$ radians

65. $\frac{\pi}{7} = \frac{\pi}{7}\left(\frac{180}{\pi}\right) \approx 25.714^\circ$

67. $\frac{13\pi}{8} = \frac{13\pi}{8}\left(\frac{180}{\pi}\right) = 292.5^\circ$

69. $-2 = -2\left(\frac{180}{\pi}\right) \approx -114.592^\circ$

71. $s = r\theta$

$6 = 5\theta$

$\theta = \frac{6}{5}$ radians

73. $s = r\theta$

$32 = 7\theta$

$\theta = \frac{32}{7} = 4\frac{4}{7}$ radians

75. $s = r\theta$

$8 = 29\theta$

$\theta = \frac{8}{29}$ radians

77. $s = r\theta$

$35 = 14.5\theta$

$\theta = \frac{70}{29} \approx 2.414$ radians

79. $s = r\theta$

$s = 15(180)\left(\frac{\pi}{180}\right) = 15\pi \approx 47.124$ radians

81. $s = r\theta$

$s = 2(1) = 2$ meters

83. $\theta = 42^\circ\,7'\,45'' - 25^\circ\,46'\,26''$

$= 16^\circ\,21'\,19'' \approx 0.28545$ radian

$s = r\theta = 4000(0.28545) \approx 1141.81$ miles

85. $\theta = \frac{s}{r} = \frac{450}{6378} \approx 0.07056$ radian $\approx 4.04^\circ$

$\approx 4^\circ\,2'\,33.02''$

87. $\theta = \frac{s}{r} = \frac{2.5}{6} = \frac{25}{60} = \frac{5}{12}$ radian $\approx 23.87^\circ$

89. (a) single axel: $1\frac{1}{2}$ revolutions $= 360^\circ + 180^\circ = 540^\circ$

$= 2\pi + \pi = 3\pi$ radians

(b) double axel: $2\frac{1}{2}$ revolutions $= 720^\circ + 180^\circ = 900^\circ$

$= 4\pi + \pi = 5\pi$ radians

(c) triple axel: $3\frac{1}{2}$ revolutions $= 1260^\circ$

$= 7\pi$ radians

91. speed = (360 revolutions/minute)$(2\pi\,(1.68)$ inches/revolution)

$= 1209.6\pi$ inches/minute

$= 20.16\pi$ inches/second

93. False, 1 radian $= \left(\frac{180}{\pi}\right)^\circ \approx 57.3^\circ$, so one radian is much larger than one degree.

95. (a) An angle is in standard position when the origin is the vertex and the initial side coincides with the positive x-axis.

(b) A negative angle is generated by a clockwise rotation.

(c) Angles that have the same initial and terminal sides are coterminal angles.

(d) An obtuse angle is between 90° and 180°.

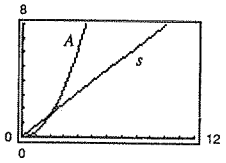
97. $A = \frac{1}{2}r^2\theta = \frac{1}{2}(10)^2 \cdot \frac{\pi}{3} = \frac{50}{3}\pi$ square meters

99. $A = \frac{1}{2}r^2\theta, s = r\theta$

(a) $\theta = 0.8 \implies A = \frac{1}{2}r^2(0.8) = 0.4r^2$ Domain: $r > 0$

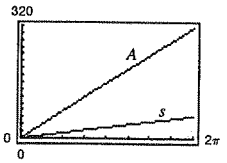
$s = r\theta = r(0.8)$ Domain: $r > 0$

The area function changes more rapidly for $r > 1$ because it is quadratic and the arc length function is linear.



(b) $r = 10 \implies A = \frac{1}{2}(10^2)\theta = 50\theta$ Domain: $0 < \theta < 2\pi$

$s = r\theta = 10\theta$ Domain: $0 < \theta < 2\pi$



101. $y = 4.54x + 16.4$

103. $x^2 + 11x + 28 = (x + 4)(x + 7) = 0$

Zeros: $x = -4, -7$

105. $x^3 + 3x^2 - 10x = x(x^2 + 3x - 10) = x(x + 5)(x - 2) = 0$

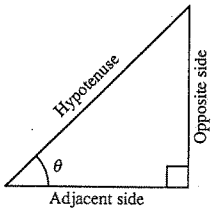
Zeros: $x = 0, -5, 2$

Section 5.2 Right Triangle Trigonometry

■ You should know the right triangle definition of trigonometric functions.

(a) $\sin\theta = \frac{\text{opp}}{\text{hyp}}$ (b) $\cos\theta = \frac{\text{adj}}{\text{hyp}}$ (c) $\tan\theta = \frac{\text{opp}}{\text{adj}}$

(d) $\csc\theta = \frac{\text{hyp}}{\text{opp}}$ (e) $\sec\theta = \frac{\text{hyp}}{\text{adj}}$ (f) $\cot\theta = \frac{\text{adj}}{\text{opp}}$



■ You should know the following identities.

(a) $\sin\theta = \frac{1}{\csc\theta}$ (b) $\csc\theta = \frac{1}{\sin\theta}$ (c) $\cos\theta = \frac{1}{\sec\theta}$

(d) $\sec\theta = \frac{1}{\cos\theta}$ (e) $\tan\theta = \frac{1}{\cot\theta}$ (f) $\cot\theta = \frac{1}{\tan\theta}$

(g) $\tan\theta = \frac{\sin\theta}{\cos\theta}$ (h) $\cot\theta = \frac{\cos\theta}{\sin\theta}$ (i) $\sin^2\theta + \cos^2\theta = 1$

(j) $1 + \tan^2\theta = \sec^2\theta$ (k) $1 + \cot^2\theta = \csc^2\theta$

—CONTINUED—