

Obj. 18 Unit Circle and Circular Functions
Homework Problems
SOLUTIONS

College Algebra, pg. 580: 9-42 (×3s), 54-87 (×3s)

9. $\tan \frac{3\pi}{4}$

$$x = -\frac{\sqrt{2}}{2}, y = \frac{\sqrt{2}}{2}$$

$$\tan \frac{3\pi}{4} = \frac{y}{x} = \frac{\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = -1$$

12. $\cot \frac{5\pi}{6}$

$$x = -\frac{\sqrt{3}}{2}, y = \frac{1}{2}$$

$$\cot \frac{5\pi}{6} = \frac{x}{y} = \frac{-\frac{\sqrt{3}}{2}}{\frac{1}{2}} = -\sqrt{3}$$

15. $\cos \frac{7\pi}{4}$

$$\cos \frac{7\pi}{4} = x = \frac{\sqrt{2}}{2}$$

18. (HW)

21. $\tan \frac{5\pi}{6}$

$$x = -\frac{\sqrt{3}}{2}, y = \frac{1}{2}$$

$$\frac{y}{x} = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$$

24. $\sin .8203 = .7314$

27. $\tan 4.0203 = 1.2065$

30. (HW)

33. $\cot 6.0301 = -3.8665$

36. $\cos .6 \approx .8$

39. $\sin 3.8 \approx -.8$

42. a positive angle whose sine is $-.95 \approx 1.7$

54. (HW)

57. $\sin s = .9918, s \in \left[0, \frac{\pi}{2}\right]$
 $s = 1.4426$

60. (HW)

63. $\left[\pi, \frac{3\pi}{2}\right]; \tan s = \sqrt{3}$

$$\frac{y}{x} = \sqrt{3} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} \Rightarrow s = \frac{4\pi}{3}$$

66. (HW)

69. $r = 20$ cm, $\omega = \frac{\pi}{12}$ radian/sec, $t = 6$ sec

a. $\omega = \frac{\theta}{t}$

$$\frac{\pi}{12} = \frac{\theta}{6}$$

$$\theta = \frac{6\pi}{12} = \frac{\pi}{2}$$

b. $s = r\theta$

$$= 20 \left(\frac{\pi}{2} \right) = 10\pi \text{ cm}$$

c. $v = r\omega$

$$= 20 \left(\frac{\pi}{12} \right) = \frac{5\pi}{3} \text{ cm/sec}$$

72. (HW)

75. $\theta = \frac{2\pi}{9}$ radians, $\omega = \frac{5\pi}{27}$ rad/min

$$\frac{5\pi}{27} = \frac{\frac{2\pi}{9}}{t}$$

$$5\pi t = 6\pi$$

$$t = \frac{6}{5} = 1.2 \text{ min}$$

78. $\omega = .90674$ rad/min, $t = 11.876$ min

$$.90674 = \frac{\theta}{11.876}$$

$$\theta = 10.768$$

81. $v = 9$ m/sec, $r = 5$ m

$$9 = 5\omega$$

$$\omega = \frac{9}{5} = 1.8 \text{ rad/sec}$$

84. (HW)

87. $s = 6\pi$ cm, $r = 2$ cm, $\omega = \frac{\pi}{4}$ rad/sec

$$6\pi = 2 \left(\frac{\pi}{4} \right) t$$

$$6\pi = \frac{\pi}{2} t$$

$$t = 12 \text{ sec}$$