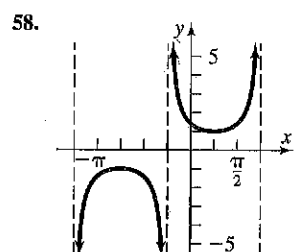
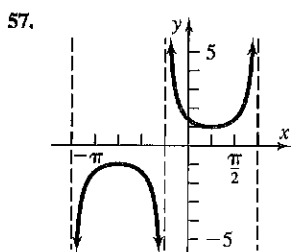
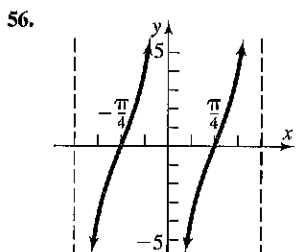
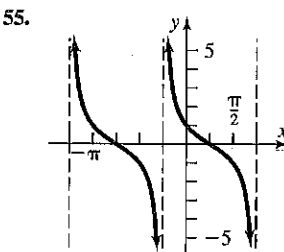
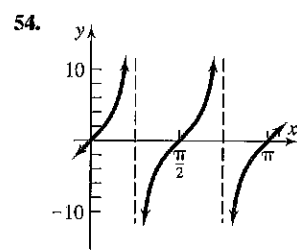
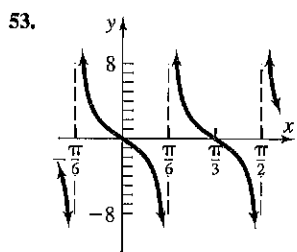
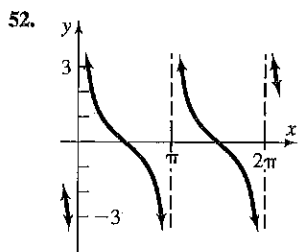
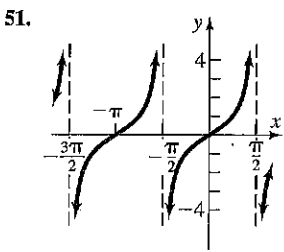
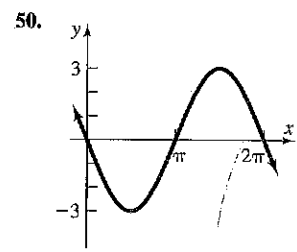
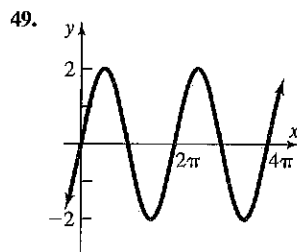
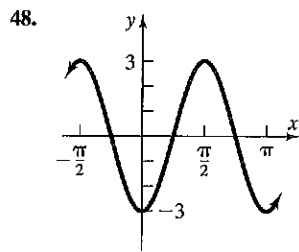
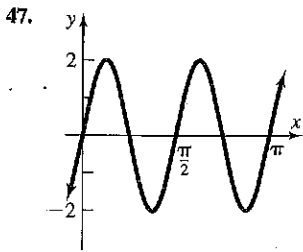
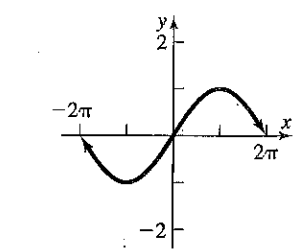
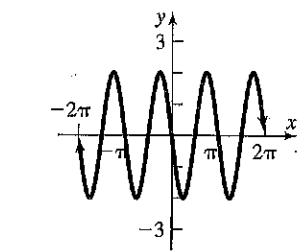
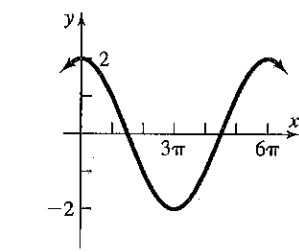
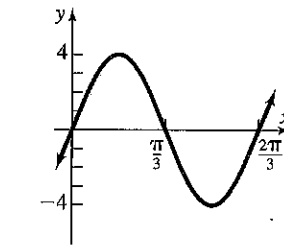


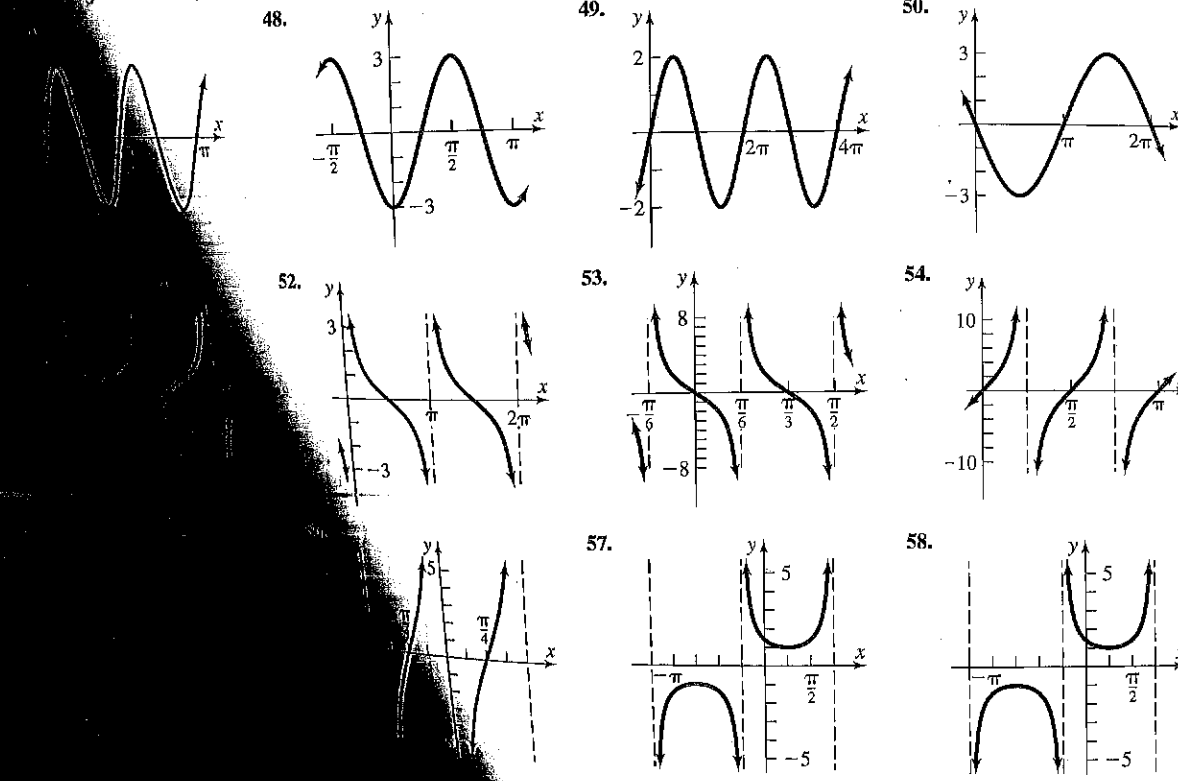
40.  $\sin \theta = -\frac{5}{13}$ ;  $\tan \theta = -\frac{5}{12}$ ;  $\csc \theta = -\frac{13}{5}$ ;  $\sec \theta = \frac{13}{12}$ ;  $\cot \theta = -\frac{12}{5}$  41.  $\sin \theta = -\frac{\sqrt{10}}{10}$ ;  $\cos \theta = -\frac{3\sqrt{10}}{10}$ ;  $\csc \theta = -\sqrt{10}$ ;  
 $\sec \theta = -\frac{\sqrt{10}}{3}$ ;  $\cot \theta = 3$  42.  $\sin \theta = \frac{2\sqrt{13}}{13}$ ;  $\cos \theta = -\frac{3\sqrt{13}}{13}$ ;  $\csc \theta = \frac{\sqrt{13}}{2}$ ;  $\sec \theta = -\frac{\sqrt{13}}{3}$ ;  $\cot \theta = -\frac{3}{2}$   
 43.  $\sin \theta = -\frac{2\sqrt{2}}{3}$ ;  $\cos \theta = \frac{1}{3}$ ;  $\tan \theta = -2\sqrt{2}$ ;  $\csc \theta = -\frac{3\sqrt{2}}{4}$ ;  $\cot \theta = -\frac{\sqrt{2}}{4}$   
 44.  $\sin \theta = -\frac{1}{4}$ ;  $\cos \theta = -\frac{\sqrt{15}}{4}$ ;  $\tan \theta = \frac{\sqrt{15}}{15}$ ;  $\sec \theta = -\frac{4\sqrt{15}}{15}$ ;  $\cot \theta = \sqrt{15}$   
 45.  $\sin \theta = \frac{\sqrt{5}}{5}$ ;  $\cos \theta = -\frac{2\sqrt{5}}{5}$ ;  $\tan \theta = -\frac{1}{2}$ ;  $\csc \theta = \sqrt{5}$ ;  $\sec \theta = -\frac{\sqrt{5}}{2}$   
 46.  $\sin \theta = -\frac{2\sqrt{5}}{5}$ ;  $\cos \theta = \frac{\sqrt{5}}{5}$ ;  $\csc \theta = -\frac{\sqrt{5}}{2}$ ;  $\sec \theta = \sqrt{5}$ ;  $\cot \theta = -\frac{1}{2}$



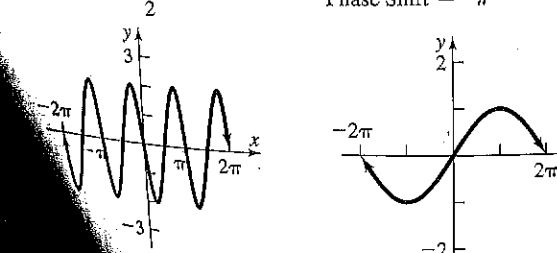
59. Amplitude = 4; period =  $2\pi$  60. Amplitude = 1; period =  $\pi$  61. Amplitude = 8; period = 4 62. Amplitude = 2; period =  $\frac{2}{3}$   
 63. Amplitude = 4  
 Period =  $\frac{2\pi}{3}$   
 Phase shift = 0 64. Amplitude = 2  
 Period =  $6\pi$   
 Phase shift = 0 65. Amplitude = 2  
 Period =  $\pi$   
 Phase Shift =  $\frac{\pi}{2}$  66. Amplitude = 1  
 Period =  $4\pi$   
 Phase Shift =  $-\pi$



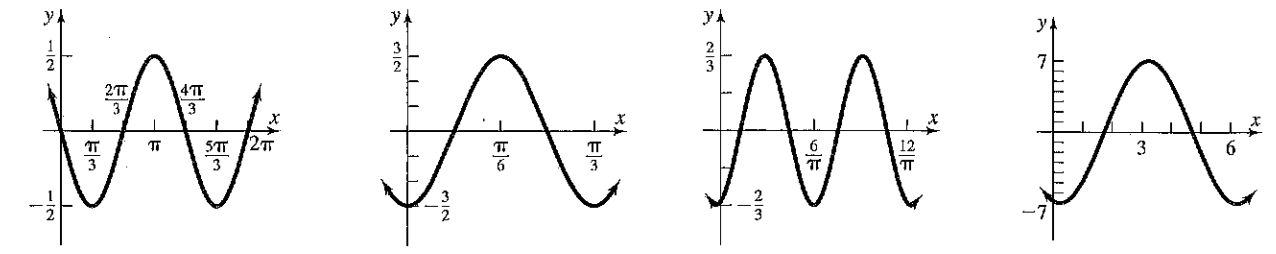
40.  $\sin \theta = -\frac{5}{13}$ ;  $\tan \theta = -\frac{5}{12}$ ;  $\csc \theta = -\frac{13}{5}$ ;  $\sec \theta = \frac{13}{12}$ ;  $\cot \theta = -\frac{12}{5}$  41.  $\sin \theta = -\frac{\sqrt{10}}{10}$ ;  $\cos \theta = -\frac{3\sqrt{10}}{10}$ ;  $\csc \theta = -\sqrt{10}$ ;  
 $\csc \theta = -\frac{\sqrt{10}}{3}$ ;  $\cot \theta = 3$  42.  $\sin \theta = \frac{2\sqrt{13}}{13}$ ;  $\cos \theta = -\frac{3\sqrt{13}}{13}$ ;  $\csc \theta = \frac{\sqrt{13}}{2}$ ;  $\sec \theta = -\frac{\sqrt{13}}{3}$ ;  $\cot \theta = -\frac{3}{2}$   
 $\sin \theta = -\frac{2\sqrt{2}}{3}$ ;  $\cos \theta = \frac{1}{3}$ ;  $\tan \theta = -2\sqrt{2}$ ;  $\csc \theta = -\frac{3\sqrt{2}}{4}$ ;  $\cot \theta = -\frac{\sqrt{2}}{4}$   
 $\sin \theta = -\frac{1}{4}$ ;  $\cos \theta = -\frac{\sqrt{15}}{4}$ ;  $\tan \theta = \frac{\sqrt{15}}{15}$ ;  $\sec \theta = -\frac{4\sqrt{15}}{15}$ ;  $\cot \theta = \sqrt{15}$   
 $\sin \theta = \frac{\sqrt{5}}{5}$ ;  $\cos \theta = -\frac{2\sqrt{5}}{5}$ ;  $\tan \theta = -\frac{1}{2}$ ;  $\csc \theta = \sqrt{5}$ ;  $\sec \theta = -\frac{\sqrt{5}}{2}$   
 $\sin \theta = \frac{2\sqrt{5}}{5}$ ;  $\cos \theta = \frac{\sqrt{5}}{5}$ ;  $\csc \theta = -\frac{\sqrt{5}}{2}$ ;  $\sec \theta = \sqrt{5}$ ;  $\cot \theta = -\frac{1}{2}$



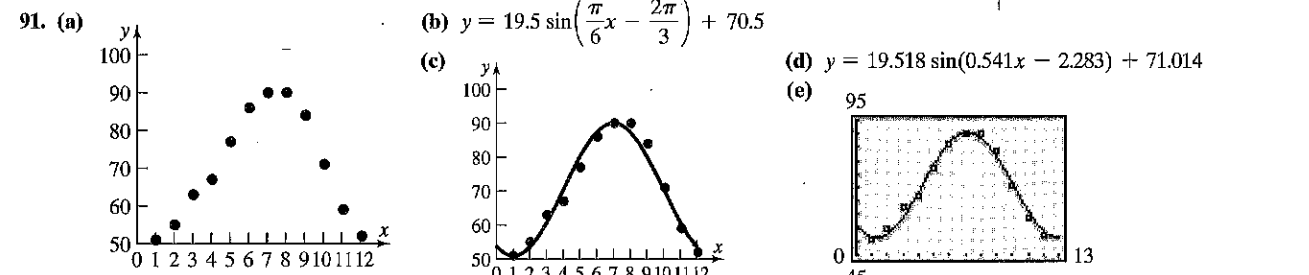
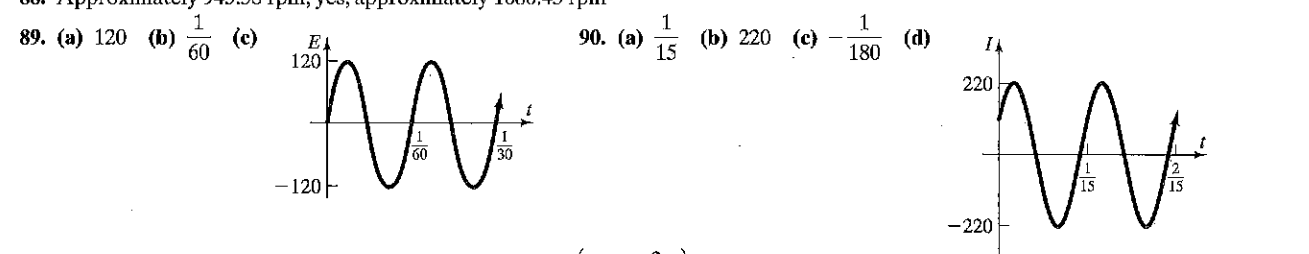
61. Amplitude = 8; period = 4 62. Amplitude = 2; period =  $\frac{2}{3}$   
 63. Amplitude = 2  
 Period =  $\pi$   
 Phase Shift =  $\frac{\pi}{2}$   
 64. Amplitude = 1  
 Period =  $4\pi$   
 Phase Shift =  $-\pi$



67. Amplitude =  $\frac{1}{2}$   
 Period =  $\frac{4\pi}{3}$   
 Phase shift =  $\frac{2\pi}{3}$   
 68. Amplitude =  $\frac{3}{2}$   
 Period =  $\frac{\pi}{3}$   
 Phase shift =  $-\frac{\pi}{2}$   
 69. Amplitude =  $\frac{2}{3}$   
 Period = 2  
 Phase shift =  $\frac{6}{\pi}$   
 70. Amplitude = 7  
 Period = 6  
 Phase shift =  $-\frac{4}{\pi}$

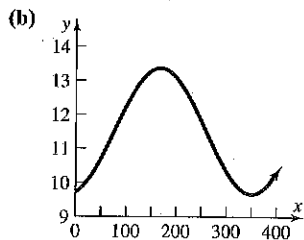


71.  $y = 5 \cos \frac{x}{4}$  72.  $y = 4 \sin \frac{x}{4}$  73.  $y = -6 \cos(\frac{\pi}{4}x)$  74.  $y = -7 \sin(\frac{\pi}{4}x)$  75. 0.38 76. 1.02  
 77. Sine, Cosine, Cosecant and Secant: Negative; Tangent and Cotangent: Positive 78. Quadrant IV  
 79.  $\sin \theta = \frac{2\sqrt{2}}{3}$ ;  $\cos \theta = -\frac{1}{3}$ ;  $\tan \theta = -2\sqrt{2}$ ;  $\csc \theta = \frac{3\sqrt{2}}{4}$ ;  $\sec \theta = -3$ ;  $\cot \theta = -\frac{\sqrt{2}}{4}$   
 80.  $\sin t = \frac{4}{5}$ ;  $\cos t = -\frac{3}{5}$ ;  $\tan t = -\frac{4}{3}$  81. Domain:  $\{x \mid x \neq \text{odd multiple of } \frac{\pi}{2}\}$ ; range:  $\{y \mid |y| \geq 1\}$ ; period =  $2(\pi)$   
 82. (a)  $32.34^\circ$  (b)  $63^\circ 10' 48''$  83.  $\frac{\pi}{3} \approx 1.05 \text{ ft}$ ;  $\frac{\pi}{3} \approx 1.05 \text{ ft}^2$  84.  $8\pi \approx 25.13 \text{ in.}$ ;  $\frac{16\pi}{3} \approx 16.76 \text{ in.}$   
 85. Approximately 114.59 revolutions/hr 86. Approximately 5.24 ft/s 87.  $0.1 \text{ revolution/s} = \frac{\pi}{5} \text{ radian/s}$   
 88. Approximately 945.38 rpm; yes; approximately 1080.43 rpm



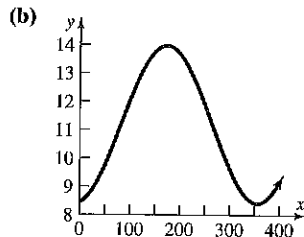
91. (a) Scatter plot of data points. (b)  $y = 19.5 \sin(\frac{\pi}{6}x - \frac{2\pi}{3}) + 70.5$ . (c)  $y = 19.518 \sin(0.541x - 2.283) + 71.014$ . (d)  $y = 19.518 \sin(0.541x - 2.283) + 71.014$ . (e) 95  
 92. (a) Scatter plot of data points. (b)  $y = 25 \sin(\frac{\pi}{6}x - \frac{2\pi}{3}) + 50$ . (c)  $y = 25.815 \sin(0.521x - 2.175) + 50.46$ . (d)  $y = 25.815 \sin(0.521x - 2.175) + 50.46$ . (e) 80

93. (a)  $y = 1.85 \sin\left(\frac{2\pi}{365}x - \frac{357}{146}\pi\right) + 11.517$



(c) 11.83 hr

94. (a)  $y = 2.775 \sin\left(\frac{2\pi}{365}x - \frac{357}{146}\pi\right) + 11.192$



(c) 11.66 hr

**Chapter Test** (page 443)

1.  $\frac{13\pi}{9}$  2.  $-\frac{20\pi}{9}$  3.  $\frac{13\pi}{180}$  4.  $-22.5^\circ$  5.  $810^\circ$  6.  $135^\circ$  7.  $\frac{1}{2}$  8. 0 9.  $-\frac{1}{2}$  10.  $-\frac{\sqrt{3}}{3}$  11. 2 12.  $\frac{3(1-\sqrt{2})}{2}$  13.  $\approx 0.292$  14.  $\approx 0.309$

15.  $\approx -1.524$  16.  $\approx 2.747$  17.

	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\sec \theta$	$\csc \theta$	$\cot \theta$
$\theta$ in QI	+	+	+	+	+	+
$\theta$ in QII	+	-	-	-	+	-
$\theta$ in QIII	-	-	+	-	-	+
$\theta$ in QIV	-	+	-	+	-	-

18.  $-\frac{3}{5}$

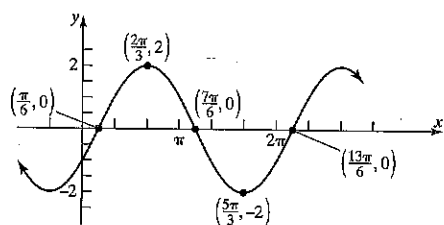
19.  $\cos \theta = -\frac{2\sqrt{6}}{7}$   
 $\tan \theta = -\frac{5}{2\sqrt{6}} = -\frac{5\sqrt{6}}{12}$   
 $\csc \theta = \frac{7}{5}$   
 $\sec \theta = -\frac{7}{2\sqrt{6}} = -\frac{7\sqrt{6}}{12}$   
 $\cot \theta = -\frac{2\sqrt{6}}{5}$

20.  $\sin \theta = -\frac{\sqrt{5}}{3}$   
 $\tan \theta = -\frac{\sqrt{5}}{2}$   
 $\csc \theta = -\frac{3}{\sqrt{5}} = -\frac{3\sqrt{5}}{5}$   
 $\sec \theta = \frac{3}{2}$   
 $\cot \theta = -\frac{2}{\sqrt{5}} = -\frac{2\sqrt{5}}{5}$

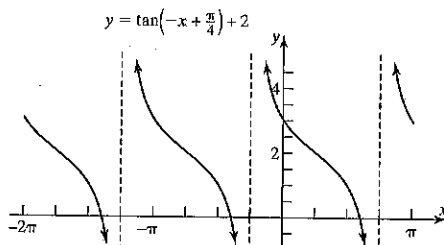
21.  $\sin \theta = \frac{12}{13}$   
 $\cos \theta = -\frac{5}{13}$   
 $\csc \theta = \frac{13}{12}$   
 $\sec \theta = -\frac{13}{5}$   
 $\cot \theta = -\frac{5}{12}$

22.  $\frac{7\sqrt{53}}{53}$   
 23.  $\frac{5\sqrt{146}}{146}$   
 24.  $-\frac{1}{2}$

25.



26.



27.  $y = -3 \sin\left(3x + \frac{3\pi}{4}\right)$

28. 121.19 ft<sup>2</sup> 29. 143.5 rpm 30. (a) 2633 ft (b) 818 ft

**Cumulative Review** (page 446)

1.  $\left\{-1, \frac{1}{2}\right\}$  2.  $y - 5 = -3(x + 2)$  or  $y = -3x - 1$  3.  $x^2 + (y + 2)^2 = 16$

4. A line. Slope  $\frac{2}{3}$ ; intercepts (6, 0) and (0, -4) 5. A circle. Center (1, -2); Radius 3

