

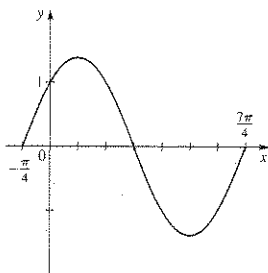
Section 7.2 ■ page 473

1. $(\sqrt{6} - \sqrt{2})/4$ 3. $-2 - \sqrt{3}$ 5. $(\sqrt{6} - \sqrt{2})/4$

7. $\sqrt{2}/2$ 9. $\sqrt{3}$ 33. $2 \sin\left(x + \frac{5\pi}{6}\right)$

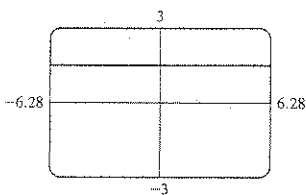
35. $5\sqrt{2} \sin\left(2x + \frac{7\pi}{4}\right)$

37. $f(x) = \sqrt{2} \sin\left(x + \frac{\pi}{4}\right)$



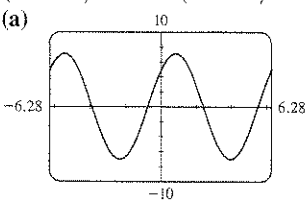
41. $\tan \gamma = \frac{17}{6}$

43. (a)



$\sin^2\left(x + \frac{\pi}{4}\right) + \sin^2\left(x - \frac{\pi}{4}\right) = 1$

45. (a)



(b) $k = 5\sqrt{2}$,
 $\theta = \pi/4$

Section 7.3 ■ page 482

1. $\frac{120}{169}, \frac{119}{169}, \frac{120}{119}$ 3. $-\frac{24}{25}, -\frac{7}{25}, \frac{24}{7}$ 5. $\frac{24}{25}, \frac{7}{25}, \frac{24}{7}$

7. $\frac{1}{2}\left(\frac{3}{4} - \cos 2x + \frac{1}{4} \cos 4x\right)$

9. $\frac{1}{32}\left(\frac{3}{4} - \cos 4x + \frac{1}{4} \cos 8x\right)$

11. $\frac{1}{16}(1 - \cos 2x - \cos 4x + \cos 2x \cos 4x)$

13. $\frac{1}{2}\sqrt{2 - \sqrt{3}}$ 15. $\frac{1}{2}\sqrt{2 + \sqrt{2}}$ 17. $\frac{1}{2}\sqrt{2 - \sqrt{3}}$

19. (a) $\sin 36^\circ$ (b) $\sin 6\theta$

21. (a) $\cos 68^\circ$ (b) $\cos 10\theta$ 23. (a) $\tan 4^\circ$ (b) $\tan 2\theta$

25. $\sqrt{10}/10, 3\sqrt{10}/10, \frac{1}{3}$

27. $\sqrt{(3 + 2\sqrt{2})/6}, \sqrt{(3 - 2\sqrt{2})/6}, 3 + 2\sqrt{2}$

29. $\sqrt{6}/6, -\sqrt{30}/6, -\sqrt{5}/5$

31. $\frac{1}{2}(\sin 5x - \sin x)$ 33. $\frac{3}{2}(\cos 11x + \cos 3x)$

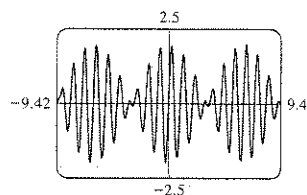
35. $2 \sin 4x \cos x$ 37. $2 \sin 5x \sin x$

39. $-2 \cos \frac{9}{2}x \sin \frac{3}{2}x$ 41. $(\sqrt{2} + \sqrt{3})/2$

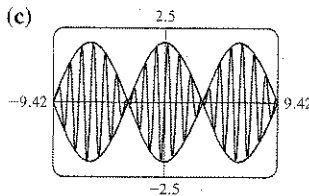
43. $\frac{1}{4}(\sqrt{2} - 1)$ 45. $\sqrt{2}/2$

69. (a)  $\frac{\sin 3x}{\sin x} - \frac{\cos 3x}{\cos x} = 2$

71. (a)



(c)



The graph of $y = f(x)$ lies between the two other graphs.

75. (a) $P(t) = 8t^4 - 8t^2 + 1$

(b) $Q(t) = 16t^5 - 20t^3 + 5t$

Section 7.4 ■ page 491

1. (a) $\pi/6$ (b) $\pi/3$ (c) Not defined

3. (a) $\pi/4$ (b) $\pi/4$ (c) $-\pi/4$

5. (a) $\pi/2$ (b) 0 (c) π

7. (a) $\pi/6$ (b) $-\pi/6$ (c) Not defined

9. (a) 0.87696 (b) 2.09601 11. $\frac{1}{3}$ 13. 10

15. $\pi/3$ 17. $-\pi/6$ 19. $-\pi/3$ 21. $\sqrt{3}/3$ 23. $\frac{1}{2}$

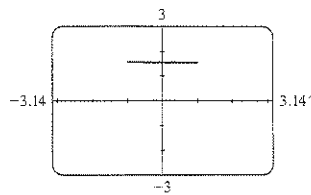
25. $\pi/3$ 27. $\frac{4}{3}$ 29. $\frac{12}{13}$ 31. $\frac{13}{5}$ 33. $\sqrt{5}/5$

35. $\frac{24}{25}$ 37. 1 39. $\sqrt{1 - x^2}$ 41. $x/\sqrt{1 - x^2}$

43. $\frac{1 - x^2}{1 + x^2}$ 45. 0 47. $\theta = \tan^{-1} \frac{50}{s}$

49. (b) $17.1^\circ, 29.7^\circ, 19.7^\circ$

51. (a)

Conjecture: $y = \pi/2$ for $-1 \leq x \leq 1$

53. (a) 0.28 (b) $(-3 + \sqrt{17})/4$

Section 7.5 ■ page 499

1. $\frac{\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi$ 3. $\frac{\pi}{3} + 2k\pi, \frac{2\pi}{3} + 2k\pi$

5. $\frac{\pi}{3} + 2k\pi, \frac{2\pi}{3} + 2k\pi, \frac{4\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi$

7. $\frac{(2k+1)\pi}{4}$ 9. $\frac{\pi}{2} + k\pi, \frac{7\pi}{6} + 2k\pi, \frac{11\pi}{6} + 2k\pi$

11. $-\frac{\pi}{3} + k\pi$ 13. $\frac{\pi}{2} + k\pi$

15. $\frac{\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi$ 17. $\frac{3\pi}{2} + 2k\pi$

19. No solution 21. $\frac{\pi}{18} + \frac{2k\pi}{3}, \frac{5\pi}{18} + \frac{2k\pi}{3}$

23. $4k\pi$ 25. $\frac{k\pi}{3}$

27. $\frac{\pi}{6} + 2k\pi, \frac{2\pi}{3} + 2k\pi, \frac{5\pi}{6} + 2k\pi, \frac{4\pi}{3} + 2k\pi$

29. $\frac{\pi}{8} + \frac{k\pi}{2}, \frac{3\pi}{8} + \frac{k\pi}{2}$

31. $\frac{\pi}{9}, \frac{5\pi}{9}, \frac{7\pi}{9}, \frac{11\pi}{9}, \frac{13\pi}{9}, \frac{17\pi}{9}$

33. $\frac{\pi}{6}, \frac{3\pi}{4}, \frac{5\pi}{6}, \frac{7\pi}{4}$

35. $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

37. $0, \frac{2\pi}{3}, \frac{4\pi}{3}$

39. (a) 1.15928, 5.12391

(b) $1.15928 + 2k\pi, 5.12391 + 2k\pi$

41. (a) 1.36944, 4.91375

(b) $1.36944 + 2k\pi, 4.91375 + 2k\pi$

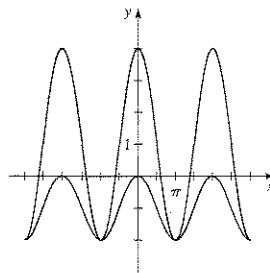
43. (a) 0.46365, 2.67795, 3.60524, 5.81954

(b) $0.46365 + k\pi, 2.67795 + k\pi$

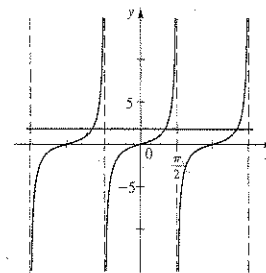
45. (a) 0.33984, 2.80176

(b) $0.33984 + 2k\pi, 2.80176 + 2k\pi$

47. $((2k+1)\pi, -2)$



49. $\left(\frac{\pi}{3} + k\pi, \sqrt{3}\right)$



51. $\frac{\pi}{8}, \frac{3\pi}{8}, \frac{5\pi}{8}, \frac{7\pi}{8}, \frac{9\pi}{8}, \frac{11\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}$

53. $\frac{\pi}{9}, \frac{2\pi}{9}, \frac{7\pi}{9}, \frac{8\pi}{9}, \frac{13\pi}{9}, \frac{14\pi}{9}$

55. $\frac{\pi}{2}, \frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}$ 57. 0 59. $\frac{k\pi}{2}$

61. $\frac{\pi}{9} + \frac{2k\pi}{3}, \frac{\pi}{2} + k\pi, \frac{5\pi}{9} + \frac{2k\pi}{3}$

63. 0, ± 0.95 65. 1.92 67. ± 0.71

Section 7.6 ■ page 507

1. $\sqrt{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$ 3. $2 \left(\cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4} \right)$

5. $4 \left(\cos \frac{11\pi}{6} + i \sin \frac{11\pi}{6} \right)$ 7. $\sqrt{2} \left(\cos \frac{3\pi}{2} + i \sin \frac{3\pi}{2} \right)$

9. $5\sqrt{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$

11. $8 \left(\cos \frac{11\pi}{6} + i \sin \frac{11\pi}{6} \right)$ 13. $20(\cos \pi + i \sin \pi)$

15. $5[\cos(\tan^{-1} \frac{4}{3}) + i \sin(\tan^{-1} \frac{4}{3})]$

17. $3\sqrt{2} \left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right)$

19. $8 \left(\cos \frac{\pi}{6} + i \sin \frac{\pi}{6} \right)$

21. $\sqrt{5} [\cos(\tan^{-1} \frac{1}{2}) + i \sin(\tan^{-1} \frac{1}{2})]$

23. $2 \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$

25. $z_1 z_2 = \cos \pi + i \sin \pi; \frac{z_1}{z_2} = \cos \left(\frac{\pi}{2} \right) - i \sin \left(\frac{\pi}{2} \right)$

27. $z_1 z_2 = 14 \left(\cos \frac{12\pi}{7} + i \sin \frac{12\pi}{7} \right)$

$$\frac{z_1}{z_2} = \frac{7}{2} \left(\cos \frac{6\pi}{7} + i \sin \frac{6\pi}{7} \right)$$