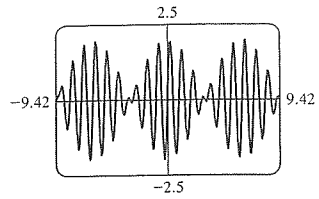
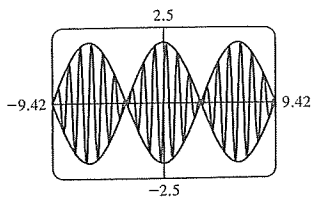
99. (a)

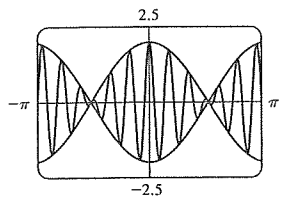


(c)

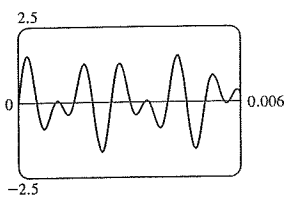


The graph of $y = f(x)$ lies between the two other graphs.

101. (a) $P(t) = 8t^4 - 8t^2 + 1$ (b) $Q(t) = 16t^5 - 20t^3 + 5t$
104. (b) 25 cm^2 (c) 7.07 cm × 3.54 cm
107. (a) and (c)



The graph of f lies between the graphs of $y = 2\cos t$ and $y = -2\cos t$. Thus, the loudness of the sound varies between $y = \pm 2\cos t$.
108. (a) $y = \sin 1540\pi t + \sin 2418\pi t$
(b) $y = 2\sin 1979\pi t \cos 439\pi t$
(c)



SECTION 7.4 ■ PAGE 522

1. infinitely many **2.** no, infinitely many
3. 0.3; $x \approx -9.7, -6.0, -3.4, 0.3, 2.8, 6.6, 9.1$ **4.** (a) 0.30, 2.84 (b) 2π, $0.30 + 2k\pi$, $2.84 + 2k\pi$ **5.** $\frac{\pi}{3} + 2k\pi, \frac{2\pi}{3} + 2k\pi$
6. $-\frac{\pi}{4} + 2k\pi, \frac{5\pi}{4} + 2k\pi$ **7.** $(2k+1)\pi$
8. $\frac{\pi}{6} + 2k\pi, \frac{11\pi}{6} + 2k\pi$ **9.** $1.32 + 2k\pi, 4.97 + 2k\pi$
10. $-0.30 + 2k\pi, 3.45 + 2k\pi$ **11.** $-0.47 + 2k\pi, 3.61 + 2k\pi$
12. $1.25 + 2k\pi, 5.04 + 2k\pi$ **13.** $-\frac{\pi}{3} + k\pi$ **14.** $\frac{\pi}{4} + k\pi$
15. $1.37 + k\pi$ **16.** $-0.32 + k\pi$ **17.** $\frac{5\pi}{6} + 2k\pi, \frac{7\pi}{6} + 2k\pi$; $-7\pi/6, -5\pi/6, 5\pi/6, 7\pi/6, 17\pi/6, 19\pi/6$
18. $-\frac{\pi}{3} + 2k\pi, \frac{\pi}{3} + 2k\pi$; $-5\pi/3, -\pi/3, \pi/3, 5\pi/3, 7\pi/3, 11\pi/3$
19. $\frac{\pi}{4} + 2k\pi, \frac{3\pi}{4} + 2k\pi$; $-7\pi/4, -5\pi/4, \pi/4, 3\pi/4, 9\pi/4, 11\pi/4$
20. $-\frac{\pi}{3} + 2k\pi, \frac{4\pi}{3} + 2k\pi$; $-2\pi/3, -\pi/3, 4\pi/3, 5\pi/3, 10\pi/3, 11\pi/3$
21. $1.29 + 2k\pi, 5.00 + 2k\pi$; $-5.00, -1.29, 1.29, 5.00, 7.57, 11.28$
22. $1.19 + k\pi$; $-5.09, -1.95, 1.19, 4.33, 7.47, 10.61$
23. $-1.47 + k\pi$; $-7.75, -4.61, -1.47, 1.67, 4.81, 7.95$
24. $-1.12 + 2k\pi, 4.26 + 2k\pi$; $-2.02, -1.12, 4.26, 5.16, 10.54, 11.44$ **25.** $(2k+1)\pi$ **26.** $\frac{3\pi}{2} + 2k\pi$
27. $-\frac{\pi}{4} + 2k\pi, \frac{5\pi}{4} + 2k\pi$ **28.** $-\frac{\pi}{4} + 2k\pi, \frac{\pi}{4} + 2k\pi$
29. $0.20 + 2k\pi, 2.94 + 2k\pi$ **30.** $1.82 + 2k\pi, 4.46 + 2k\pi$
31. $-\frac{\pi}{6} + k\pi, \frac{\pi}{6} + k\pi$ **32.** $\frac{3\pi}{4} + k\pi$ **33.** $\frac{\pi}{4} + k\pi, \frac{3\pi}{4} + k\pi$
34. $\frac{\pi}{3} + k\pi, \frac{2\pi}{3} + k\pi$ **35.** $-1.11 + k\pi, 1.11 + k\pi$
36. $-0.34 + k\pi, 0.34 + k\pi$ **37.** $\frac{\pi}{4} + k\pi, \frac{3\pi}{4} + k\pi$
38. $\frac{\pi}{6} + k\pi, \frac{5\pi}{6} + k\pi$
39. $-1.11 + k\pi, 1.11 + k\pi, \frac{2\pi}{3} + 2k\pi, \frac{4\pi}{3} + 2k\pi$
40. $-0.25 + k\pi, 1.11 + k\pi, 0.25 + k\pi$
41. $\frac{\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi$ **42.** $\frac{7\pi}{6} + 2k\pi, \frac{11\pi}{6} + 2k\pi, \frac{\pi}{2} + 2k\pi$
43. $0.34 + 2k\pi, 2.80 + 2k\pi$ **44.** $\pm 1.25 + k\pi, \pm 1.11 + k\pi$
45. $\frac{\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi$ **46.** $\frac{3\pi}{2} + 2k\pi$ **47.** No solution
48. No solution **49.** $\frac{3\pi}{2} + 2k\pi$ **50.** $k\pi, \frac{\pi}{6} + k\pi, \frac{5\pi}{6} + k\pi$
51. $\frac{\pi}{2} + k\pi, \frac{7\pi}{6} + 2k\pi, \frac{11\pi}{6} + 2k\pi$
52. $\frac{\pi}{4} + 2k\pi, \frac{7\pi}{4} + 2k\pi$
53. $\frac{\pi}{2} + k\pi$ **54.** $k\pi, \frac{3\pi}{4} + k\pi$
55. $k\pi, 0.73 + 2k\pi, 2.41 + 2k\pi$
56. $\frac{\pi}{2} + k\pi, -0.85 + 2k\pi, 3.99 + 2k\pi$
57. 44.95° **58.** 41.1°
59. (a) 0° (b) 60°, 120° (c) 90°, 270° (d) 180°

SECTION 7.5 ■ PAGE 528

1. $\sin x = 0, k\pi$ **2.** $\sin x + 2\sin x\cos x = 0$, $\sin x = 0, 1 + 2\cos x = 0$ **3.** $-\frac{\pi}{6} + 2k\pi, \frac{7\pi}{6} + 2k\pi, \frac{\pi}{2} + 2k\pi$
4. No solution **5.** $(2k+1)\pi, 1.23 + 2k\pi, 5.05 + 2k\pi$
6. $-\frac{\pi}{4} + k\pi, 0.46 + k\pi$ **7.** $k\pi, 0.72 + 2k\pi, 5.56 + 2k\pi$
8. $k\pi, 1.23 + 2k\pi, 5.05 + 2k\pi$ **9.** $\frac{\pi}{6} + 2k\pi, \frac{5\pi}{6} + 2k\pi$
10. $\frac{\pi}{4} + k\pi, \frac{3\pi}{4} + k\pi$ **11.** $\frac{\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi, (2k+1)\pi$
12. $\frac{\pi}{3} + k\pi, \frac{2\pi}{3} + k\pi$ **13.** $(2k+1)\pi, \frac{\pi}{2} + 2k\pi$
14. $2k\pi, \frac{3\pi}{2} + 2k\pi$ **15.** $2k\pi$ **16.** $-1.24 + k\pi, \frac{\pi}{4} + k\pi$