

24. $[1, 6]$ 25. $(-\infty, -2] \cup [6, \infty)$ 26. $[-1, 5]$ 27. $(0, 2)$ 28. $h = \frac{3V}{lw}$ 29. $x = \frac{y - y_1}{m} + x_1$

30. 31. 32. $47 + 16i$ 33. $2 + i$ 34. $38i$ 35. 2018 36. 2018

37. quite well 38. drive-in theaters: 1; movie theaters: 17; video rental stores: 65
39. 26 yr; \$33,600 40. \$3000 at 8%; \$7000 at 10%
41. length = 12 ft; width = 4 ft 42. 10 ft 43. \$50
44. more than 200 calls

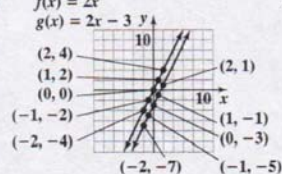
CHAPTER 2

Section 2.1

Check Point Exercises

1. domain: $\{0, 10, 20, 30, 36\}$; range: $\{9.1, 6.7, 10.7, 13.2, 17.4\}$ 2. a. not a function b. function 3. a. $y = 6 - 2x$; function
b. $y = \pm\sqrt{1 - x^2}$; not a function 4. a. 42 b. $x^2 + 6x + 15$ c. $x^2 + 2x + 7$

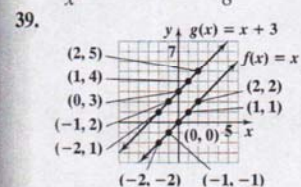
5. $f(x) = 2x$; The graph of g is the graph of f shifted down by 3 units.



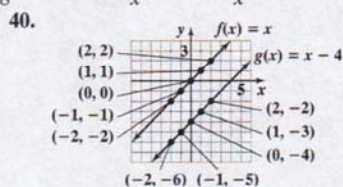
6. a. function b. function c. not a function 7. a. 400 b. 9 c. approximately 425
8. a. domain: $\{x | -2 \leq x \leq 1\}$; range: $\{y | 0 \leq y \leq 3\}$
b. domain: $\{x | -2 < x \leq 1\}$; range: $\{y | -1 \leq y < 2\}$
c. domain: $\{x | -3 \leq x < 0\}$; range: $\{-3, -2, -1\}$

Exercise Set 2.1

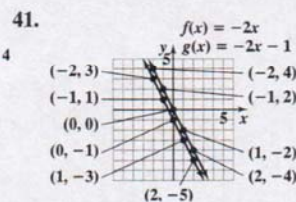
1. function; $\{1, 3, 5\}$; $\{2, 4, 5\}$ 2. function; $\{4, 6, 8\}$; $\{5, 7, 8\}$ 3. not a function; $\{3, 4\}$; $\{4, 5\}$ 4. not a function; $\{5, 6\}$; $\{6, 7\}$
5. function; $\{3, 4, 5, 7\}$; $\{-2, 1, 9\}$ 6. function; $\{-2, -1, 5, 10\}$; $\{1, 4, 6\}$ 7. function; $\{-3, -2, -1, 0\}$; $\{-3, -2, -1, 0\}$
8. function; $\{-7, -5, -3, 0\}$; $\{-7, -5, -3, 0\}$ 9. not a function; $\{1\}$; $\{4, 5, 6\}$ 10. function; $\{4, 5, 6\}$; $\{1\}$ 11. y is a function of x .
12. y is a function of x . 13. y is a function of x . 14. y is a function of x . 15. y is not a function of x . 16. y is not a function of x .
17. y is not a function of x . 18. y is not a function of x . 19. y is a function of x . 20. y is a function of x . 21. y is a function of x .
22. y is a function of x . 23. y is a function of x . 24. y is a function of x . 25. y is a function of x . 26. y is a function of x .
27. a. 29 b. $4x + 9$ c. $-4x + 5$ 28. a. 19 b. $3x + 10$ c. $-3x + 7$ 29. a. 2 b. $x^2 + 12x + 38$ c. $x^2 - 2x + 3$
30. a. 8 b. $x^2 - 6x - 19$ c. $x^2 + 10x - 3$ 31. a. 13 b. 1 c. $x^4 - x^2 + 1$ d. $81a^4 - 9a^2 + 1$ 32. a. 25 b. $-\frac{15}{4}$
c. $-x^3 + x + 1$ d. $27a^3 - 3a + 1$ 33. a. 3 b. 7 c. $\sqrt{x} + 3$ 34. a. -3 b. 1 c. $\sqrt{2x} - 6$ 35. a. $\frac{15}{4}$ b. $\frac{15}{4}$
c. $\frac{4x^2 - 1}{x^2}$ 36. a. $\frac{33}{8}$ b. $\frac{31}{8}$ c. $\frac{-4x^3 + 1}{-x^3}$ or $\frac{4x^3 - 1}{x^3}$ 37. a. 1 b. -1 c. 1 38. a. 1 b. -1 c. $\begin{cases} 1, & \text{if } x < -6 \\ -1, & \text{if } x > -6 \end{cases}$



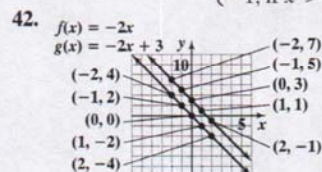
The graph of g is the graph of f shifted up by 3 units.



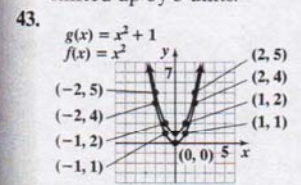
The graph of g is the graph of f shifted down by 4 units.



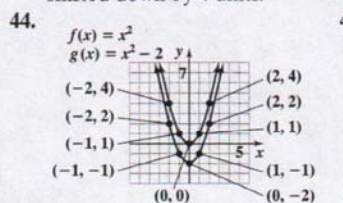
The graph of g is the graph of f shifted down by 1 unit.



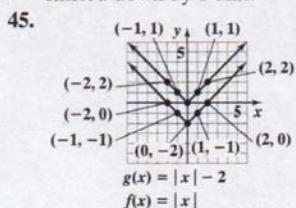
The graph of g is the graph of f shifted up by 3 units.



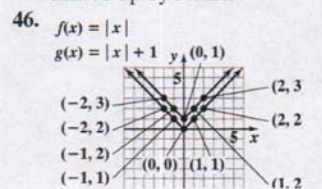
The graph of g is the graph of f shifted up by 1 unit.



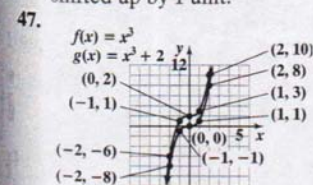
The graph of g is the graph of f shifted down by 2 units.



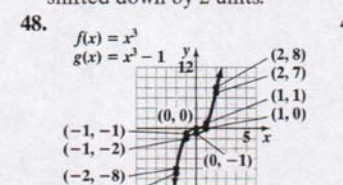
The graph of g is the graph of f shifted down by 2 units.



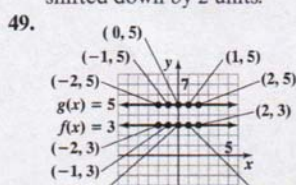
The graph of g is the graph of f shifted up by 1 unit.



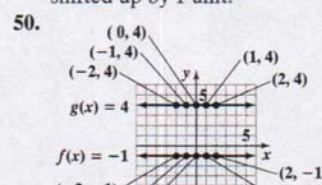
The graph of g is the graph of f shifted up by 2 units.



The graph of g is the graph of f shifted down by 1 unit.

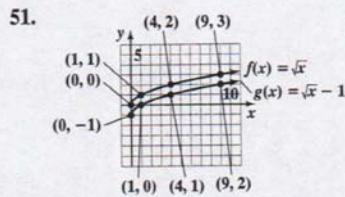


The graph of g is the graph of f shifted up by 2 units.

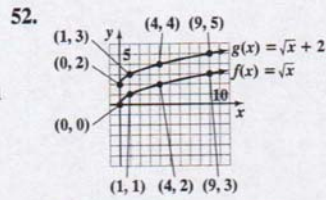


The graph of g is the graph of f shifted up by 5 units.

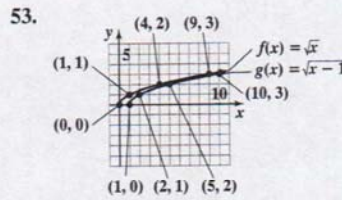
AA14 Answers to Selected Exercises



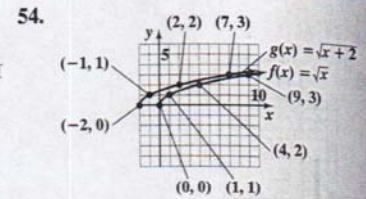
The graph of g is the graph of f shifted down by 1 unit.



The graph of g is the graph of f shifted up by 2 units.

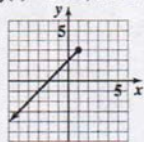


The graph of g is the graph of f shifted to the right by 1 unit.



The graph of g is the graph of f shifted to the left by 2 units.

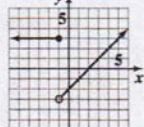
55. function 56. function 57. function 58. not a function 59. not a function 60. not a function 61. function
 62. not a function 63. function 64. function 65. -4 66. -4 67. 4 68. 4 69. 0 70. 0 71. 2 72. -2 73. 2
 74. -2 75. -2 76. 1 77. a. $(-\infty, \infty)$ b. $[-4, \infty)$ c. -3 and 1 d. -3 e. $f(-2) = -3$ and $f(2) = 5$ 78. a. $(-\infty, \infty)$
 b. $(-\infty, 4]$ c. -3 and 1 d. 3 e. $f(-2) = 3$ and $f(2) = -5$ 79. a. $(-\infty, \infty)$ b. $[1, \infty)$ c. none d. 1
 e. $f(-1) = 2$ and $f(3) = 4$ 80. a. $(-\infty, \infty)$ b. $[0, \infty)$ c. -1 d. 1 e. $f(-4) = 3$ and $f(3) = 4$ 81. a. $[0, 5]$ b. $[-1, 5]$
 c. 2 d. -1 e. $f(3) = 1$ 82. a. $(-6, 0]$ b. $[-3, 4)$ c. -3.75 d. -3 e. $f(-5) = 2$ 83. a. $[0, \infty)$ b. $[1, \infty)$
 c. none d. 1 e. $f(4) = 3$ 84. a. $[-1, \infty)$ b. $[0, \infty)$ c. -1 d. 1 e. $f(3) = 2$ 85. a. $[-2, 6]$ b. $[-2, 6]$ c. 4
 d. 4 e. $f(-1) = 5$ 86. a. $[-3, 2]$ b. $[-5, 5]$ c. $-\frac{1}{2}$ d. 1 e. $f(-2) = -3$ 87. a. $(-\infty, \infty)$ b. $(-\infty, -2]$ c. none
 d. -2 e. $f(-4) = -5$ and $f(4) = -2$ 88. a. $(-\infty, \infty)$ b. $[0, \infty)$ c. $\{x | x \leq 0\}$ d. 0 e. $f(-2) = 0$ and $f(2) = 4$
 89. a. $(-\infty, \infty)$ b. $(0, \infty)$ c. none d. 1.5 e. $f(4) = 6$ 90. a. $(-\infty, 1)$ or $(1, \infty)$ b. $(-\infty, 0)$ or $(0, \infty)$ c. none d. -1
 e. $f(2) = 1$ 91. a. $\{-5, -2, 0, 1, 3\}$ b. $\{2\}$ c. none d. 2 e. $f(-5) + f(3) = 4$ 92. a. $\{-5, -2, 0, 1, 4\}$ b. $\{-2\}$
 c. none d. -2 e. $f(-5) + f(4) = -4$ 93. $-2; 10$ 94. $-8; 76$ 95. -38 96. 0 97. $-2x^3 - 2x$ 98. $6x$
 99. a. $\{(Iceland, 9.7), (Finland, 9.6), (New Zealand, 9.6), (Denmark, 9.5)\}$ b. Yes, each country is paired with only one corruption rating.
 c. $\{(9.7, Iceland), (9.6, Finland), (9.6, New Zealand), (9.5, Denmark)\}$ d. No, the corruption rating 9.6 is paired with two different countries, Finland and New Zealand. 100. a. $\{(Bangladesh, 1.7), (Chad, 1.7), (Haiti, 1.8), (Myanmar, 1.8)\}$ b. Yes, each country is paired with only one corruption rating.
 c. $\{(1.7, Bangladesh), (1.7, Chad), (1.8, Haiti), (1.8, Myanmar)\}$ d. No, the corruption rating 1.7 is paired with two different countries, Bangladesh and Chad. 101. a. 83 ; The chance that a 60-year-old will survive to age 70 is 83% . b. 76 ; The chance that a 60-year-old will survive to age 70 is 76% .
 c. f 102. a. 25 ; The chance that a 60-year-old will survive to age 90 is 25% . b. 10 ; The chance that a 60-year-old will survive to age 90 is 10% . c. f 103. a. 127 ; In 2004, Americans ordered an average of 127 takeout meals per person.; by the point $(20, 127)$
 b. 94 ; In 1984, Americans ordered an average of 94 meals in restaurants per person.; by the point $(0, 94)$ c. $1988; 91$ takeout meals and 91.6 meals in restaurants 104. a. 126 ; In 2002, Americans ordered an average of 126 takeout meals per person.; by the point $(18, 126)$ b. 82 ; In 2004, Americans ordered an average of 82 meals in restaurants per person.; by the point $(20, 82)$ 105. $C = 100,000 + 100x$, where x is the number of bicycles produced; $C(90) = 109,000$; It costs $\$109,000$ to produce 90 bicycles. 106. $V = 22,500 - 3200x$; $V(3) = 12,900$; The value of the car after 3 years is $\$12,900$. 107. $T = \frac{40}{x} + \frac{40}{x+30}$, where x is the rate on the outgoing trip; $T(30) = 2$; It takes 2 hours, traveling 30 mph outgoing and 60 mph returning. 108. $S = 0.1x + 0.6(50 - x)$, where x is the number of milliliters of the 10% solution; $S(30) = 15$; There are 15 milliliters of sodium iodine in the mixture when 30 milliliters of the 10% solution are used. 109. makes sense 110. does not make sense 111. does not make sense 112. does not make sense 113. does not make sense 114. does not make sense 115. does not make sense 116. does not make sense 117. does not make sense 118. does not make sense 119. does not make sense 120. does not make sense 121. does not make sense 122. false 123. false 124. true 125. false 126. 3 127. Answers will vary; an example is $\{(1, 1), (2, 1)\}$. 128. $f(2) = 6; f(3) = 9; f(4) = 12$; no 129. 36 ; For 100 calling minutes, the monthly cost is $\$36$. 130. $f(x) = x + 2, x \leq 1$ 131. $4xh + 2h^2 + 3h$



Section 2.2

Check Point Exercises

1. increasing on $(-\infty, -1)$, decreasing on $(-1, 1)$, increasing on $(1, \infty)$ 2. a. even b. odd c. neither
 3. a. 20 ; With 40 calling minutes, the cost is $\$20$; $(40, 20)$ b. 28 ; With 80 calling minutes, the cost is $\$28$; $(80, 28)$
 4. 5. a. $-2x^2 - 4xh - 2h^2 + x + h + 5$ b. $-4x - 2h + 1, h \neq 0$



$$f(x) = \begin{cases} 3 & \text{if } x \leq -1 \\ x - 2 & \text{if } x > -1 \end{cases}$$

Exercise Set 2.2

1. a. $(-1, \infty)$ b. $(-\infty, -1)$ c. none 2. a. $(-\infty, -1)$ b. $(-1, \infty)$ c. none 3. a. $(0, \infty)$ b. none c. none
 4. a. $(-1, \infty)$ b. none c. none 5. a. none b. $(-2, 6)$ c. none 6. a. $(-3, 2)$ b. none c. none
 7. a. $(-\infty, -1)$ b. none c. $(-1, \infty)$ 8. a. $(0, \infty)$ b. none c. $(-\infty, 0)$ 9. a. $(-\infty, 0)$ or $(1.5, 3)$
 b. $(0, 1.5)$ or $(3, \infty)$ c. none 10. a. $(-5, -4)$ or $(-2, 0)$ or $(2, 4)$ b. $(-4, -2)$ or $(0, 2)$ or $(4, 5)$ c. none
 11. a. $(-2, 4)$ b. none c. $(-\infty, -2)$ or $(4, \infty)$ 12. a. none b. $(-4, 2)$ c. $(-\infty, -4)$ or $(2, \infty)$ 13. a. $0; f(0) = 4$
 b. $-3, 3; f(-3) = f(3) = 0$ 14. a. $0; f(0) = 2$ b. $-3, 3; f(-3) = f(3) = -1$ 15. a. $-2; f(-2) = 21$ b. $1; f(1) = -6$ 16. a. $1; f(1) = 30$
 b. $4; f(4) = 3$ 17. odd 18. odd 19. neither 20. neither 21. even 22. even 23. even 24. even