

1.2 Answers to Review Exercises

1.2.1 Answers for: Simplify each expression.

1. $\frac{1}{36}$

2. $\frac{1}{14}$

3. $\frac{1}{2}$

4. 2

5. $-\frac{2}{5}$

6. 2

7. $-2\sqrt{3}$

8. $9\sqrt[3]{3}$

9. $-x\sqrt[3]{2x}$

10. $75x^{\frac{7}{4}}$

11. $2x^3y^{-1}$

12. $\left(\frac{y}{x}\right)^2$

13. $\frac{12x^{\frac{1}{2}}}{y^{\frac{4}{3}}}$

14. $-4y^{\frac{19}{2}}$

15. $-y\sqrt[3]{3x}$

16. $\frac{2}{3x^3y^5}$

17. $\frac{x^2}{8y}$

18. $\frac{9}{32}x^2y$

1.2.2 Answers for: Factor the expression completely.

19. $12y^2(3y^2 + 2)$

20. $3xy(3x^2 + 2y)$

21. $(x + 12)(x - 12)$

22. $(11 + y)(11 - y)$

23. $(9a + b^3)(9a - b^3)$

24. $(x^2 + 4)(x + 2)(x - 2)$

25. $(2z - 3)(4z^2 + 6z + 9)$

26. $(x + 2)^2$

27. $5(5x + 2)(x + 1)$

28. $-3(2u + 7)(u - 3)$

29. $(y - 6)(y^2 + 2)$

30. $(2x - 1)(2x^2 + 3)$

31. $(x - 5)(x - 9)$

32. $(2x - 3)(3x - 4)$

33. $(3x - 5y)(2x + y)$

34. $(6x + 7y)(6x - 7y)$

35. $(8x - 1)^2$

36. $5x(x + 3)(x - 3)$

37. $(x + 2)(x + 1)(x - 1)$

38. $\frac{5}{2}(x + 2)^2(x - 2)$

39. $(x - 5)(x + 5)(x + 3)$

40. $3y^2(4y + 1)(4y - 1)$

41. $\frac{1}{2}(2x + 3)(2x - 3)(3y - 1)$

42. $(x - 1)(6x - 5)(2x + 1)$

43. $(3x + 2)^3(36x^2 - 37x + 6)$

44. $2(x^2 + 4)(6x - 5)^2(21x^2 - 10x + 36)$

45. $2(x^2 + 4)^4(x - 2)^3(-3x^2 + 10x + 8)$

46. $-18(2x - 3)^2(9 - 2x^3)^4(4x^3 - 5x^2 - 3)$

47. $\frac{7(2x - 1)^2(2x + 5)}{2(x + 3)^{1/2}}$

48. $\frac{x^2 + 9}{3(x^2 + 3)^{4/3}}$

49. $3(2x - 3)(x + 3)(x - 2)$

50. $(x + y)^2(x + y - 10)(x + y + 10)$

51. $(x - 1)(x - 2)(x + 3)$

52. $(x + 2)(x - 3)(x - 4)$

1.2.3 Answers for: Complete the Square

53. $(x + 3)^2 - 9$

55. $(y - 4)^2 - 4$

57. $5\left(x - \frac{3}{10}\right)^2 - \frac{169}{20}$

54. $\left(t - \frac{9}{2}\right)^2 - \frac{81}{4}$

56. $25 - (x - 1)^2$

58. $\frac{27}{4} - 3\left(x - \frac{1}{2}\right)^2$

1.2.4 Answers for: Perform the Indicated Operations

59. $\frac{25x + 110}{x + 4}$

61. $\frac{3x + 6}{x - 8}$

63. $\frac{x^2 + 3x + 9}{x(x^2 - 9)}$

65. $\frac{8x^2 + 10x - 6}{x^2(x + 3)}$

67. $\frac{1}{6}$

69. $\frac{3}{4}$

71. $\frac{sr}{r^2 - s^2}$

73. -3

75. 2

77. $2x + h - 3, \quad h \neq 0$

79. $\frac{(4x - 5)(28x + 11)}{(3x + 2)^{\frac{2}{3}}}$

81. $\frac{(x^2 + 9)^3(23x^2 + 144x - 9)}{3(x + 6)^{\frac{4}{3}}}$

83. $-\frac{5x^2(x^2 + 3)}{(x^2 - 5)^5}$

85. $-\frac{x(x^2 - 2)}{(1 - x^2)^{\frac{3}{2}}}$

60. $\frac{180 - 8x}{x - 10}$

62. $\frac{y + 3}{5y - 3}$

64. $\frac{3x^2 - 10x + 2}{(x + 2)(x - 2)(x - 5)}$

66. $\frac{4x^2 - 1}{2x(x + 1)^2}$

68. $\frac{4x + 5}{x - 1}$

70. $\frac{x^2 - 2}{2x}$

72. $\frac{1}{(x + h + 1)(x + 1)}, \quad h \neq 0$

74. $\frac{2x(3x + 2)}{x - 1}$

76. $\frac{35(x + 1)^2}{2x^2}$

78. $\frac{1}{x(x + 2)}$

80. $\frac{(3x + 1)^5(39x - 89)}{(2x - 5)^{\frac{1}{2}}}$

82. $\frac{-2x(3x^2 + 1)}{(x^2 - 1)^5}$

84. $\frac{x^2 + 12}{(x^2 + 4)^{\frac{4}{3}}}$

86. $-\frac{6x + 19}{6(3x + 2)^{\frac{3}{2}}(2x + 3)^{\frac{2}{3}}}$

1.2.5 Answers for: Rationalize the Numerator

87. $\frac{1}{(x + y)(\sqrt{x} + \sqrt{y})}, \quad x \neq y$

88. $\frac{2}{\sqrt{2(x + h) + 1} + \sqrt{2x + 1}}, \quad h \neq 0$

1.2.6 Answers for: Solve the Equation

89. $x = -3$ or $x = 4$
91. No solutions - false
93. $x = 3$
95. $x = -1$, $x = 0$, or $x = 6$
97. $x = 2 \pm \sqrt{7}$
99. No real solutions
101. $x = -2$ or $x = 3$
103. $z = -2$ or $z = 2$
105. $x = 1$
107. $x = -3$
109. No solution ($x \neq \pm 4$)
111. $q = \frac{fp}{p-f}$
113. $x = 2$ ($x = -10$ is extraneous)
115. $x = 9$
117. $x = 4$ or $x = -2 \pm \sqrt{5}$
90. $x = -3$ or $x = \frac{4}{3}$
92. All \mathbb{R} (reals)
94. $x = -5$ or $x = -1$
96. $x = 0$, $x = 7$, or $x = 12$
98. $x = \frac{-4 \pm \sqrt{10}}{2}$
100. $x = \frac{3 \pm \sqrt{65}}{4}$
102. $x = -\frac{3}{2}$ or $x = 2$
104. $x = -2$, $x = -1$, $x = 0$, or $x = 2$
106. $x = \frac{25}{7}$
108. $t = -4$
110. $q = \frac{p(1-S)}{S(1-p)}$
112. $R_2 = \frac{RR_1R_2}{R_1R_3 - RR_3 - RR_1}$
114. $x = -1$ ($x = -6$ is extraneous)
116. $x = 8$
118. $x = -4$, $x = -\frac{1}{3}$, or $x = 2$

1.2.7 Answers for: Solve the Absolute Value Inequality

119. $(-\frac{22}{3}, 4)$
121. $(-\infty, -8)$ or $(16, \infty)$
123. $[0, 8]$
120. $(-7, 9)$
122. $(-\infty, \infty)$
124. $(-\infty, -5]$ or $[1, \infty)$

1.2.8 Answers for: Polynomial Division

125. $x^3 - 3x^2 - x + 1$
127. $-5x^3 - x^2 + 2x - 1 - \frac{7}{2x-3}$
129. $x^2 + 4x + 1$
131. $x^2 - 4x + 1 + \frac{4x-1}{2x^3+1}$
126. $x^2 + x + 1 - \frac{1}{x-1}$
128. $\frac{1}{2}x^3 + \frac{15}{4}x^2 + \frac{69}{8}x + \frac{127}{16} + \frac{333}{16(2x-3)}$
130. $x - 1 - \frac{3x+10}{2x^2+4x+5}$
132. $2x^2 + 3x - 1$

1.2.9 Answers for: Function Notation

133. (a) 10 (b) $-\frac{1}{2}$ (c) $20 - 7t$ (d) $-7x - 4$
134. (a) 0 (b) $-\frac{3}{2}$ (c) $-\frac{5}{2}$ (d) $\frac{3x + 12}{x - 1}$
135. (a) 2 (b) Undefined (c) 2 (d) $\frac{x}{x - 1}$
136. (a) 2 (b) -2 (c) 10 (d) -8
137. (a) -14 (b) 20 (c) 31 (d) 24
138. (a) $2x^2 + 8x$ (b) $4x + 2$ (c) $2x - 12$ $x \neq 0$ (d) $4x + 2h, h \neq 0$
139. $6x + 3h + 1, h \neq 0$ 140. $-2x - h - 3, h \neq 0$ 141. $\frac{-2x - h}{2x^2(x + h)^2}, h \neq 0$ 142. $\frac{1}{\sqrt{x + h - 1}\sqrt{x - 1}}, h \neq 0$

1.2.10 Answers for: Function Operations

143. (a) $f(g(x)) = 16x^2 - 8x + 4$ (b) $g(f(x)) = 4x^2 + 11$ (c) $f(g(3)) = 124$
144. (a) $f(g(x)) = \sqrt{x + 1}$ (b) $g(f(x)) = \sqrt{x} + 1$ (c) $f(g(3)) = 2$
145. (a) $f(g(x)) = x$ (b) $g(f(x)) = x$ (c) $f(g(3)) = 3$
146. (a) $f(g(x)) = -5x^2 + 20x - 7$ (b) $g(f(x)) = -25x^2 + 40x - 13$ (c) $f(g(3)) = 8$
147. $f^{-1}(x) = \frac{x + 3}{4}$ 148. $f^{-1}(x) = \frac{\sqrt[3]{x - 1}}{2}$ 149. $f^{-1}(x) = \frac{2}{x - 5}$ 150. $f^{-1}(x) = \frac{-x - 3}{x - 2}, x \neq 2$
151. $[-\frac{5}{3}, 3)$ 152. $(-\infty, -3] \cup (-1, 1)$ 153. $(-\infty, -1) \cup [1, 2] \cup (3, \infty)$ 154. $(-4, -2) \cup (2, 5)$