

## 1.2 Answers to Review Exercises

### 1.2.1 Answers for: Simplify each expression.

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

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

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

7.  $-2\sqrt{3}$

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

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

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

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

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

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

4. 2

6. 2

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

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

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

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

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

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

### 1.2.2 Answers for: Factor the expression completely.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

26.  $(x + 2)^2$

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

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

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

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

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

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

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

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

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

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

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

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

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.  $(-4, -2) \cup (2, 5)$