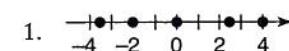
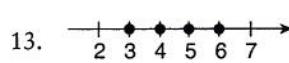


- Exercise Set 1.1
- Chapter 1**
- Answers to Selected Odd-Numbered Exercises, Review Exercises, and Review Tests
- In the answers that follow, the WINDOW values given will allow your graphing calculator to show important features of the functions examined in the various exercises. There are many other WINDOW values that will produce similar results. Note that viewing rectangles on some graphing calculators will not show all points. Furthermore, in some cases vertical lines will incorrectly appear on the graphing screen. (See Section 5.1 for additional information.) Therefore, because of differences in graphing calculators, the display on your calculator may vary from those shown here.
- It is also important to note that the value you obtain when using TRACE on your graphing calculator are approximate. It is often necessary to ZOOM-IN to obtain more accurate results. Although the coordinates in the text are correct, they do not necessarily correspond to any values obtained when using the TRACE command.
- It is also important to note that the value you obtain using TRACE on your graphing calculator are approximate. It is often necessary to ZOOM-IN to obtain more accurate results. Although the coordinates in the text are correct, they do not necessarily correspond to any values obtained when using the TRACE command.
1.  $\{3, 4, 5, 6, 7\}$     3.  $\{-9\}$     5.  $\{1, 2\}$     51.  $a. \frac{1}{2} + \frac{1}{2} = 1, \frac{3}{2} + \left(-\frac{1}{2}\right) = 1, \frac{3}{2} + \frac{4}{4} = 2$   
                     b.  $\sqrt{2} + (-\sqrt{2}) = 0, (\pi + 2) + (-\pi) = 2,$   
                     c.  $21$     d.  $-3$     e.  $\frac{10}{3}$     f.  $-\frac{10}{3}$   
                     g.  $\frac{5}{4}$     h.  $\frac{1}{2}$     i.  $\frac{3}{4}$   
                     j.  $\frac{33}{28}$     k.  $\frac{18}{175}$     l.  $\frac{12}{35}$
23. associative (addition)    25. distributive  
                     27. associative (multiplication)    29. closure (multiplication)  
                     31. commutative (multiplication)    33. commutative, associative (multiplication)  
                     35. multiplicative inverse    41. symmetric  
                     43. transitive or substitution

# Appendix I

55. a. 0.25      b.  $-0.6$   
       c. 0.769230769      d. 0.285714286  
 57. 35 miles      59. 4 feet and 6 feet  
 61. 13 ounces      63. \$256.10  
 65. \$10,652

**Exercise Set 1.2**

1.   
 3.  $A : 1, B : 2.5, C : -2, D : 4, O : 0, E : -3.5$   
 5. 4   
 7.  $-2$   
 9.  $-5$   
 11.   
 13.  $10 > 9.99$   
 15.  $a \geq 0$   
 21.  $\frac{1}{4} < a < \frac{1}{2}$   
 23.  $b \geq 5$

25. multiplication by negative number or addition preserves the inequality sign

27. multiplication by negative number

29. multiplication by positive number

31. 2      33. 1.5      35.  $-2$   
 37. 1      39. 4      41. 2  
 43.  $\frac{1}{5}$       45. 3      47. 2  
 49.  $\frac{8}{5}$       51. when  $x$  and  $y$  have the same sign  
 53.  $\{-2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8\}$   
 55. a.  $1 < 7$       b.  $-6 < 0$       c.  $-2 < 10$   
       d.  $5 > -25$       e.  $1 > -5$       f.  $-\frac{1}{2} < \frac{5}{2}$   
       g.  $1 < 25$

57.  $\frac{7}{2}$       59.  $-2$       61. 0  
 63. a.  $x \leq 3$       b.  $x \leq \frac{2}{5}$

**Exercise Set 1.3**

1. 0      3.  $-8$       5.  $-\frac{1}{8}$       7. 13  
 9. a. \$2160      b. \$2080      c. \$2106.67

11. 9.37      13.  $-9$       15.  $\frac{3}{2}$       17. 0  
 19.  $b^7$       21.  $-20y^9$       23.  $-3x^4$   
 25. a. 1      b. 100,000,000  
       c. 32      d. 7  
 27.  $c, d$       29. 2; 3      31.  $\frac{3}{5}; 4$   
 33. 3      35. 4      37. 11  
 39. 176.20      41.  $\frac{bh}{2}$   
 43. cost of all purchases      45.  $5x + 3$   
 47.  $2s^2t^3 - 3s^2t^2 + 2s^2t + 3st^2 + st - s + 2t - 3$   
 49.  $-2a^2bc + ab^2c - 2ab^3 + 3$   
 51.  $-2x^4 + 4x^3 - x^2 + 4x - 4$   
 53.  $6s^3 - s^2 - 11s + 6$   
 55.  $-4y^5 - 2y^4 + 2y^3 - 5y^2 - 3y$   
 57.  $4a^5 - 16a^4 + 14a^3 - 3a^2 - 14a + 15$   
 59.  $3b^4 + 3ab^3 + 2b^3 - 7ab^2 + 2b^2 - 4ab - 6a$   
 61.  $-6x^2 + 22x - 12$       63.  $98x - 38y - 20z$   
 65.  $x^2 + 2x - 3$       67.  $4x^2 + 8x + 3$   
 69.  $3x^2 - 5x + 2$       71.  $x^2 + 2xy + y^2$   
 73.  $9x^2 - 6x + 1$       75.  $4x^2 - 1$   
 77.  $x^4 + 2x^2y^2 + y^4$   
 79. a.  $3^{11}$       b.  $2^{n+2}$   
 81. a.  $\frac{4}{x^2} - 1$       b.  $\frac{w^2x^2}{y^2} - \frac{2wxz}{y} + z^2$   
       c.  $x^2 + y^2 - z^2 + 2xy$   
 83. Eric  
 85. a. 392      b. 96  
       c. 16,777,216      d. 4,294,966,528

**Exercise Set 1.4**

1.  $5(x - 3)$       3.  $-2(x + 4y)$   
 5.  $5b(c + 5)$       7.  $-y^2(3 + 4y^3)$   
 9.  $3x^2(1 + 2y - 3z)$       11.  $(x + 1)(x + 3)$   
 13.  $(y - 3)(y - 5)$       15.  $(a - 3b)(a - 4b)$   
 17.  $\left(y - \frac{1}{3}\right)\left(y + \frac{1}{3}\right)$       19.  $(3 - x)(3 + x)$

21.  $(x - 7)(x + 2)$
22.  $(x - 3)^2$
23.  $\left(\frac{1}{4} + y\right)\left(\frac{1}{4} - y\right)$
24.  $\frac{(x + 2)(2x + 3)}{x + 4}$ ,  $x \neq 2$
25.  $(x + 3)(x + 8)$
26.  $(3a - 2)(a - 3)$
27.  $23. 2a$
28.  $21. xy$
29.  $27. (x - 2)(x + 3) 29. x(x + 1)(x - 1)$
30.  $31. (2x + 1)(x - 2)$
31.  $35. (3x + 2)(2x + 3)$
32.  $33. (3a - 2)(a - 3)$
33.  $37. 4y - 15$
34.  $35. \frac{x + 5}{3}$
35.  $33. \frac{4(a + 1)}{(a - 2)(a + 2)}$
36.  $37. 5x - 2x$
37.  $39. 2(x + 3)$
38.  $41. \frac{23x + 24}{6(x + 3)(x - 3)}$
39.  $61. (x + 3y)(x - 3y)$
40.  $63. (3x - y)(9x^2 + 3xy + y^2)$
41.  $65. (a + 2)(a^2 - 2a + 4)$
42.  $67. \frac{1}{(m - 2n)}\left(\frac{1}{4}m^2 + mn + 4n^2\right)$
43.  $69. (x + y - 2)(x^2 + 2xy + y^2 + 2x + 2y + 4)$
44.  $71. (2x^2 - 5y^2)(4x^4 + 10x^2y^2 + 25y^4)$
45.  $73. 4(y + 2)(x - 1)$
46.  $75. -(x + 2)^2(5x + 31)$
47.  $77. \text{any integer}$
48.  $79. a - b, a \neq -b, a \neq 0, b \neq 0$
49.  $81. a. b(3x^2 + 3xy + y^2)$
50.  $83. a. C(R^2 + 1 + r)(R + 1 - r)$
51.  $85. b. 7 \cdot 2^n$
52.  $87. d. (R_1 + R_2)(R_1 + R_2 - 2r)$
53.  $89. c. (X - L)(X - L)$
54.  $91. \frac{1}{x - 4}, x \neq -4$
55.  $93. x - 4, x \neq 4$
56.  $95. -2b(5 + a), a \neq 5, b \neq -3$
57.  $97. \frac{3x + 1}{x + 2}, x \neq -1$
58.  $99. \frac{3x + 1}{x + 2}, x \neq -1, x \neq 2$
60.  $101. \frac{1}{x + 1}, x \neq -1$
61.  $103. \frac{x - 2}{x - 1}, x \neq -1, x \neq 0$
62.  $105. \frac{1}{x + 1}, x \neq -1$
63.  $107. \frac{(y + 2)(y + 1)}{(y + 2)(y - 1)}, y \neq 0, y \neq -1$
64.  $109. \frac{(x + 1)(x + 2)(x + 3)}{x^2 + x + 3}$
65.  $111. \frac{4x(x + 4)}{x^2 - 4x - 1}, x \neq 0, x \neq 4$
66.  $113. \frac{4x(x + 4)}{x^2 - 4x - 1}, x \neq 0, x \neq 4$
67.  $115. \frac{R_1R_2R_3R_4}{R_2R_3R_4 + R_1R_3R_4 + R_1R_2R_4 + R_1R_2R_3}$
68.  $117. a. \frac{1}{b} + \frac{1}{a} = \frac{b + a}{a}$
69. a.  $69. a. \frac{1}{b} + \frac{1}{a} = \frac{b + a}{a}$
- b.  $71. \frac{1}{b} \cdot \frac{1}{a} = \frac{1}{b + a}$
- c.  $73. \frac{1}{b} + \frac{1}{a} = \frac{b + a}{a}$
- d.  $75. \text{left-hand side cannot be simplified}$
- e.  $77. (x^2 - y^2)^2 = x^4 - 2x^2y^2 + y^4$
- f.  $79. \text{left-hand side cannot be simplified}$
- Exercise Set 1.6

13.  $x^{19}$       15.  $-32x^{10}$       17.  $x^{4n}$       67.  $3 + 4\sqrt{3}$       69.  $3xy$       71.  $5 - 2\sqrt{6}$   
 19.  $\frac{1}{x^2}$       21.  $30x^8$       23. 1      73.  $3x - 4y - \sqrt{6xy}$       75.  $\frac{3(3 - \sqrt{2})}{7}$   
 25.  $\left(\frac{3}{2}\right)^n x^{2n} y^{3n}$       27.  $(2x + 1)^{10}$       29.  $2^{2n} a^{4n} b^{6n}$       77.  $\frac{2(4 + \sqrt{3})}{13}$       79.  $\frac{-3(3\sqrt{a} - 1)}{9a - 1}$   
 31.  $\frac{4}{3}$       33. 3      35. 81      81.  $\frac{-3(5 - \sqrt{5y})}{5(5 - y)}$       83.  $3 + 2\sqrt{2}$   
 37.  $-x^3$       39.  $y^6$       41. 25      85.  $2 + \sqrt{6} + 3\sqrt{2} + 2\sqrt{3}$       87.  $\frac{2}{\sqrt{12} + \sqrt{10}}$   
 43.  $\frac{1}{3^6}$  or  $\frac{1}{729}$       45.  $x^9$       47. 32      89.  $\frac{-1}{\sqrt{x} + 4}$   
 49.  $2x^2y$       51.  $\frac{a^4b^6}{9}$       53.  $-\frac{8y^{12}}{x^9}$       95. a.  $x^{7/8}$       b.  $\frac{(x - 1)^2}{x}$       c.  $\frac{\sqrt{1 + x^2}}{2}$   
 55.  $\frac{a^9}{3b^4}$       57.  $\frac{4a^{10}c^6}{b^8}$       59.  $\frac{1}{a - 2b^2}$       d.  $\frac{3}{5}$       e.  $\frac{5}{(1 + x^2)^{3/2}}$   
 61.  $\frac{(a - b)^2}{a + b}$       63.  $\frac{b + a}{b - a}$       67. 0.074      97.  $\frac{\sqrt{Lc_1c_2(c_1 + c_2)}}{2\pi(c_1 + c_2)}$   
 69. 0.0113      71.  $9.1 \times 10^{-3}$       73.  $2.3 \times 10^1$   
 75.  $8.0 \times 10^{-4}$       77. 0.000893      79. 145,000  
 81. 0.001253      83.  $3.05 \times 10^{-3}$   
 85.  $1.67 \times 10^4$  persons per square mile  
 87. a.  $\frac{5}{12}$       b.  $a(1 + r + r^2)$       c.  $3^{10m}$       d. 64      e.  $4 \times 10^{-13}$

**Exercise Set 1.7**

1. 8      3.  $\frac{1}{16}$       5.  $2x^{13/12}$   
 7.  $x^{5/36}$       9.  $x^2y^{12}$       11.  $\frac{x^9}{y^6}$   
 13.  $\sqrt[5]{\frac{1}{16}}$       15.  $\sqrt[4]{a^3}$       17.  $\sqrt[3]{\frac{144x^6}{y^4}}$   
 19.  $8^{3/4}$       21.  $(-8)^{-2/5}$       23.  $\left(\frac{4a^3}{9}\right)^{-1/4}$   
 25.  $\frac{2}{3}$       27. not real      29. 5  
 31.  $\frac{5}{4}$       33. 54.82      35. 3, 4  
 37.  $4\sqrt{3}$       39.  $3\sqrt[3]{2}$       41.  $y^2\sqrt[3]{y}$   
 43.  $2x^2\sqrt[4]{6}\sqrt{x}$       45.  $x^2y\sqrt{xy}$       47.  $2x^2y\sqrt[4]{y}$   
 49.  $\frac{\sqrt{5}}{5}$       51.  $\frac{\sqrt{3y}}{3y}$       53.  $2x\sqrt{2x}$   
 55.  $y^2\sqrt[3]{x^2y}$       57.  $7\sqrt{3}$       59.  $7\sqrt{x}$   
 61.  $4\sqrt{3}$       63.  $11\sqrt{5} - \sqrt[3]{5}$       65.  $-5\sqrt{5}$

**Exercise Set 1.8**

1. 1      3.  $-i$       5.  $-i$   
 7. 1      9.  $i$       11.  $-\frac{3}{4} + 0i$   
 13.  $0 + 5i$       15.  $0 - 6i$       17.  $3 - 7i$   
 19.  $0.3 - 7\sqrt{2}i$       21.  $-2 - 4i$       23.  $x = \frac{2}{3}, y = -8$

25.  $x = -1, y = -\frac{9}{2}$       27.  $3 + i$       29.  $5 + i$   
 31.  $-5 - 4i$       33.  $2 - 6i$       35.  $-1 - \frac{1}{2}i$   
 37.  $5 + 0i$       39.  $2 + 14i$       41.  $4 - 7i$   
 43. 5      45. 25      47. 20  
 49.  $-\frac{13}{10} + \frac{11}{10}i$       51.  $-\frac{7}{25} - \frac{24}{25}i$       53.  $\frac{8}{5} - \frac{1}{5}i$   
 55.  $\frac{5}{3} - \frac{2}{3}i$       57.  $\frac{4}{5} + \frac{8}{5}i$       59.  $\frac{4}{25} - \frac{3}{25}i$   
 61.  $\frac{9}{10} + \frac{3}{10}i$       63.  $0 + \frac{1}{5}i$       65. 0  
 67. 3      75.  $y \geq 5$

**Review Exercises**

1. {1, 2, 3, 4}      2. {-3, -2, -1}      3. {2}  
 4. T      5. F      6. F