

Chapter 1

Section 1.2 Practice Exercises

1. The place value of the 8 in 38,760,005 is millions.
2. The place value of the 8 in 67,890 is hundreds.
3. The place value of the 8 in 481,922 is ten-thousands.
4. 67 is written as sixty-seven.
5. 395 is written as three hundred ninety-five.
6. 12,804 is written as twelve thousand, eight hundred four.
7. 321,670,200 is written as three hundred twenty-one million, six hundred seventy thousand, two hundred.
8. Twenty-nine in standard form is 29.
9. Seven hundred ten in standard form is 710.
10. Twenty-six thousand, seventy-one in standard form is 26,071.
11. Six million, five hundred seven in standard form is 6,000,507.
12. 1,047,608
 $= 1,000,000 + 40,000 + 7000 + 600 + 8$
13. a. Find “France” in the left column. Then read from left to right until the “Literature” column is reached. We find that France has 15 Nobel Prize winners in Literature.

b. Look at the “Total” column. Three countries have more than 60 Nobel Prize winners. The United States has 342, the United Kingdom has 106, and Germany has 79.

Vocabulary, Readiness & Vocabulary Check 1.2

1. The numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, ... are called whole numbers.
2. The number 1,286 is written in standard form.
3. The number “twenty-one” is written in words.
4. The number $900 + 60 + 5$ is written in expanded form.

5. In a whole number, each group of 3 digits is called a period.
6. The place value of the digit 4 in the whole number 264 is ones.
7. hundreds
8. To read (or write) a number, read from left to right.
9. 80,000
10. Boott Spur Mountain

Exercise Set 1.2

2. The place value of the 5 in 905 is ones.
4. The place value of the 5 in 6527 is hundreds.
6. The place value of the 5 in 79,050,000 is ten-thousands.
8. The place value of the 5 in 51,682,700 is ten-millions.
10. 316 is written as three hundred sixteen.
12. 5445 is written as five thousand, four hundred forty-five.
14. 42,009 is written as forty-two thousand, nine.
16. 3,204,000 is written as three million, two hundred four thousand.
18. 47,033,107 is written as forty-seven million, thirty-three thousand, one hundred seven.
20. 22,806 is written as twenty-two thousand, eight hundred six.
22. 119,948 is written as one hundred nineteen thousand, nine hundred forty-eight.
24. 500,000,000 is written as five hundred million
26. 11,239 is written as eleven thousand, two hundred thirty-nine.
28. 202,700 is written as two hundred two thousand, seven hundred.

30. Four thousand, four hundred sixty-eight in standard form is 4468.
32. Seventy-three thousand, two in standard form is 73,002.
34. Sixteen million, four hundred five thousand, sixteen in standard form is 16,405,016.
36. Two million, twelve in standard form is 2,000,012.
38. Six hundred forty thousand, eight hundred eighty-one in standard form is 640,881.
40. Two hundred thirty-four thousand in standard form is 234,000.
42. Two thousand eighty in standard form is 2080.
44. Eighty million, eight hundred fourteen thousand dollars in standard form is \$80,814,000.
46. Two thousand, five hundred forty-four in standard form is 2544.
48. $789 = 700 + 80 + 9$
50. $6040 = 6000 + 40$
52. $20,215 = 20,000 + 200 + 10 + 5$
54. $99,032 = 90,000 + 9000 + 30 + 2$
56. $47,703,029 = 40,000,000 + 7,000,000 + 700,000 + 3000 + 20 + 9$
58. The elevation of Mt. Washington in standard form is 6288. 6288 is written as six thousand, two hundred eighty-eight.
60. $5712 = 5000 + 700 + 10 + 2$
62. The second tallest mountain in New England is Mt. Adams.
64. The Louvre had more visitors than the British Museum.
66. The number of visitors to the The Metropolitan Museum of Art was 6,116,000, which is written as six million, one hundred sixteen thousand.
68. Six of the museums listed were visited by fewer than 6,000,000 people.
70. The largest number is 77,753.

72. Yes

74. answers may vary

76. 5 trillion in the American system is written as 5,000,000,000,000 in standard form.

Section 1.3 Practice Exercises

$$\begin{array}{r} 1. \quad 7235 \\ + 542 \\ \hline 7777 \end{array}$$

$$\begin{array}{r} 2. \quad \begin{array}{cc} 11 & 11 \\ 27,364 \\ + 92,977 \\ \hline 120,341 \end{array} \end{array}$$

$$\begin{array}{c} 3. \quad 11 + 7 + 8 + 9 + 13 \\ \swarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \searrow \\ 20 + 8 + 20 \\ \swarrow \quad \downarrow \quad \searrow \\ 48 \end{array}$$

$$\begin{array}{r} 4. \quad \begin{array}{cc} 11 & 2 \\ 19 \\ 5042 \\ 638 \\ + 526 \\ \hline 6225 \end{array} \end{array}$$

5. $2 \text{ cm} + 8 \text{ cm} + 15 \text{ cm} + 5 \text{ cm} = 30 \text{ cm}$
The perimeter is 30 centimeters.

6. $647 + 647 + 647 = 1941$
The perimeter is 1941 feet.

$$\begin{array}{r} 7. \quad 70 \\ + 50 \\ \hline 120 \end{array}$$

Georgia produces 120 million pounds of freestone peaches.

8. a. The country with the fewest threatened mammal species corresponds to the shortest bar, which is Malaysia.
- b. To find the total number of threatened mammal species for Brazil, India, and Mexico, we add.

$$\begin{array}{r} 82 \\ 95 \\ + 101 \\ \hline 278 \end{array}$$

The total number of threatened mammal species for Brazil, India, and Mexico is 278.

Calculator Explorations

1. $89 + 45 = 134$
2. $76 + 91 = 173$
3. $285 + 55 = 340$
4. $8773 + 652 = 9425$

$$\begin{array}{r} 5. \quad 985 \\ 1210 \\ 562 \\ + 77 \\ \hline 2834 \end{array}$$

$$\begin{array}{r} 6. \quad 465 \\ 9888 \\ 620 \\ + 1550 \\ \hline 12,523 \end{array}$$

Vocabulary, Readiness & Video Check 1.3

1. The sum of 0 and any number is the same number.
2. The sum of any number and 0 is the same number.
3. In $35 + 20 = 55$, the number 55 is called the sum and 35 and 20 are each called an addend.
4. The distance around a polygon is called its perimeter.
5. Since $(3 + 1) + 20 = 3 + (1 + 20)$, we say that changing the grouping in addition does not change the sum. This property is called the associative property of addition.
6. Since $7 + 10 = 10 + 7$, we say that changing the order in addition does not change the sum. This property is called the commutative property of addition.
7. To add whole numbers, we line up place values and add from left to right.

8. triangle; 3

9. increased by

Exercise Set 1.3

$$\begin{array}{r} 2. \quad 27 \\ + 31 \\ \hline 58 \end{array}$$

$$\begin{array}{r} 4. \quad 37 \\ + 542 \\ \hline 579 \end{array}$$

$$\begin{array}{r} 6. \quad 23 \\ 45 \\ + 30 \\ \hline 98 \end{array}$$

$$\begin{array}{r} 8. \quad 236 \\ + 6243 \\ \hline 6479 \end{array}$$

$$\begin{array}{r} 10. \quad 1 \\ 41 \\ + 74 \\ \hline 115 \end{array}$$

$$\begin{array}{r} 12. \quad 1 \\ 35 \\ + 470 \\ \hline 505 \end{array}$$

$$\begin{array}{r} 14. \quad 1 \\ 17,427 \\ + 821,059 \\ \hline 838,486 \end{array}$$

$$\begin{array}{r} 16. \quad 2 \\ 3 \\ 5 \\ 8 \\ 5 \\ + 7 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 18. \quad 2 \\ 12 \\ 4 \\ 8 \\ 26 \\ + 10 \\ \hline 60 \end{array}$$

$$\begin{array}{r} 22 \\ 20. \quad 64 \\ 28 \\ 56 \\ 25 \\ + 32 \\ \hline 205 \end{array}$$

$$\begin{array}{r} 2 \\ 22. \quad 23 \\ 49 \\ + 18 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 24. \quad 30 \\ 900 \\ + 20 \\ \hline 950 \end{array}$$

$$\begin{array}{r} 111 \\ 26. \quad 1624 \\ 32 \\ + 976 \\ \hline 2632 \end{array}$$

$$\begin{array}{r} 112 \\ 28. \quad 16 \\ 1056 \\ 748 \\ + 7770 \\ \hline 9590 \end{array}$$

$$\begin{array}{r} 111 \\ 30. \quad 427 \\ 383 \\ + 229 \\ \hline 1039 \end{array}$$

$$\begin{array}{r} 1111 \\ 32. \quad 6789 \\ 4321 \\ + 5555 \\ \hline 16,665 \end{array}$$

$$\begin{array}{r} 111 \\ 34. \quad 864 \\ 33 \\ + 356 \\ \hline 1253 \end{array}$$

$$\begin{array}{r} 36. \quad 5000 \\ 1400 \\ + 3021 \\ \hline 9421 \end{array}$$

$$\begin{array}{r} 111 \\ 38. \quad 26 \\ 582 \\ 4763 \\ + 62,511 \\ \hline 67,882 \end{array}$$

$$\begin{array}{r} 111212 \\ 40. \quad 504,218 \\ 321,920 \\ 38,507 \\ + 594,687 \\ \hline 1,459,332 \end{array}$$

$$\begin{array}{r} 1 \\ 42. \quad 3 \\ 3 \\ 5 \\ + 5 \\ \hline 16 \end{array}$$

The perimeter is 16 kilometers.

$$\begin{array}{r} 1 \\ 44. \quad 3 \\ 4 \\ + 5 \\ \hline 12 \end{array}$$

The perimeter is 12 centimeters.

$$\begin{array}{r} 2 \\ 46. \quad 8 \\ 4 \\ 8 \\ + 4 \\ \hline 24 \end{array}$$

The perimeter is 24 miles.

$$\begin{array}{r} 1 \\ 48. \quad 23 \\ 23 \\ 23 \\ + 23 \\ \hline 92 \end{array}$$

The perimeter is 92 centimeters.

$$\begin{array}{l} 50. \quad 6 + 5 + 7 + 3 + 4 + 7 + 5 = 37 \\ \text{The perimeter is 37 inches.} \end{array}$$

$$\begin{array}{l} 52. \quad \text{The unknown vertical side has length} \\ 3 + 5 = 8 \text{ feet. The unknown horizontal side has} \\ \text{length } 8 + 4 = 12 \text{ feet.} \\ 8 + 3 + 4 + 5 + 12 + 8 = 40 \\ \text{The perimeter is 40 feet.} \end{array}$$

54. "Find the sum" indicates addition.

$$\begin{array}{r} 1 \\ 802 \\ + 6487 \\ \hline 7289 \end{array}$$

The sum of 802 and 6487 is 7289.

56. "Find the total" indicates addition.

$$\begin{array}{r} 12 \\ 89 \\ 45 \\ 2 \\ 19 \\ + 341 \\ \hline 496 \end{array}$$

The total of 89, 45, 2, 19, and 341 is 496.

58. "Increased by" indicates addition.

$$\begin{array}{r} 712 \\ + 38 \\ \hline 750 \end{array}$$

712 increased by 38 is 750.

60. "Plus" indicates addition.

$$\begin{array}{r} 121 \\ 3565 \\ 565 \\ + 70 \\ \hline 4200 \end{array}$$

3565 plus 565 plus 70 is 4200.

62. Add 2603 to 38,041.

$$\begin{array}{r} 1 \\ 38,041 \\ + 2,603 \\ \hline 40,644 \end{array}$$

California's projected population in 2020 is 40,644 thousand.

$$\begin{array}{r} 11 \\ 285 \\ + 98 \\ \hline 383 \end{array}$$

The distance from Kansas City to Colby is 383 miles.

$$\begin{array}{r} 21 \\ 60 \\ 45 \\ 60 \\ + 45 \\ \hline 210 \end{array}$$

The perimeter of the home is 210 feet.

$$\begin{array}{r} 1 \\ 240 \\ 100 \\ 355 \\ 500 \\ 200 \\ + 500 \\ \hline 1895 \end{array}$$

The fluid intake of the patient was 1895 cc.

70. Add 992 to 1305.

$$\begin{array}{r} 1 \\ 1305 \\ + 992 \\ \hline 2297 \end{array}$$

Hank Aaron batted in 2297 total runs during his career in professional baseball.

72. Find the sum of 26,767,000 and 4,433,000.

$$\begin{array}{r} 1111 \\ 26,767,000 \\ + 4,433,000 \\ \hline 31,200,000 \end{array}$$

The sheep population was 31,200,000.

$$\begin{array}{r} 21 \\ 257 \\ 182 \\ 257 \\ + 182 \\ \hline 878 \end{array}$$

The perimeter of the puzzle is 878 millimeters.

$$\begin{array}{r} 1940 \\ + 45 \\ \hline 1985 \end{array}$$

Allyson Felix was born in the year 1985.

78. Of the states listed, Virginia has the fewest Target stores.

$$257 + 123 + 89 + 59 + 75 + 67 + 64 + 63 + 149 + 57 = 1003$$

The total number of Target stores in the ten states listed is 1003 stores.

82. The total number of stores listed in the table is 1003 stores.

$$\begin{array}{r} 1003 \\ + 775 \\ \hline 1778 \end{array}$$

There are 1778 Target stores in the United States.

$$\begin{array}{r} 84. \quad 5260 \\ + 1225 \\ \hline 6485 \end{array}$$

The total highway mileage in Rhode Island is 6485 miles.

86. answers may vary

88. answers may vary

$$\begin{array}{r} 90. \quad \begin{array}{r} 11\ 2\ 2\ 1 \\ 78,962 \\ 129,968,350 \\ + 36,462,880 \\ \hline 166,510,192 \end{array} \end{array}$$

$$\begin{array}{r} 92. \quad \begin{array}{r} 1\ 2\ 1 \\ 773 \\ 659 \\ + 481 \\ \hline 1913 \end{array} \end{array}$$

The given answer is correct.

$$\begin{array}{r} 94. \quad \begin{array}{r} 1\ 2 \\ 19 \\ 214 \\ 49 \\ + 651 \\ \hline 933 \end{array} \end{array}$$

The given answer is incorrect.

Section 1.4 Practice Exercises

1. a. $14 - 6 = 8$ because $8 + 6 = 14$.
- b. $20 - 8 = 12$ because $12 + 8 = 20$
- c. $93 - 93 = 0$ because $0 + 93 = 93$.
- d. $42 - 0 = 42$ because $42 + 0 = 42$.

$$\begin{array}{r} 2. \text{ a. } \begin{array}{r} 9143 \\ - 122 \\ \hline 9021 \end{array} \quad \text{Check: } \begin{array}{r} 9021 \\ + 122 \\ \hline 9143 \end{array} \end{array}$$

$$\begin{array}{r} \text{b. } \begin{array}{r} 978 \\ - 851 \\ \hline 127 \end{array} \quad \text{Check: } \begin{array}{r} 127 \\ + 851 \\ \hline 978 \end{array} \end{array}$$

$$\begin{array}{r} 3. \text{ a. } \begin{array}{r} 8\ 17 \\ 69\cancel{7} \\ - 4\ 9 \\ \hline 64\ 8 \end{array} \quad \text{Check: } \begin{array}{r} 648 \\ + 49 \\ \hline 697 \end{array} \end{array}$$

$$\begin{array}{r} \text{b. } \begin{array}{r} 2\ 12 \\ \cancel{26} \\ - 245 \\ \hline 81 \end{array} \end{array}$$

$$\begin{array}{r} \text{Check: } \begin{array}{r} 81 \\ + 245 \\ \hline 326 \end{array} \end{array}$$

$$\begin{array}{r} \text{c. } \begin{array}{r} 1234 \\ - 822 \\ \hline 412 \end{array} \end{array}$$

$$\begin{array}{r} \text{Check: } \begin{array}{r} 412 \\ + 822 \\ \hline 1234 \end{array} \end{array}$$

$$\begin{array}{r} 4. \text{ a. } \begin{array}{r} 9 \\ 3\cancel{10} \\ \cancel{10}\cancel{0}\cancel{0} \\ - 1\ 6\ 4 \\ \hline 2\ 3\ 6 \end{array} \end{array}$$

$$\begin{array}{r} \text{Check: } \begin{array}{r} 236 \\ + 164 \\ \hline 400 \end{array} \end{array}$$

$$\begin{array}{r} \text{b. } \begin{array}{r} 9 \\ 9\cancel{10} \\ \cancel{10}\cancel{0}\cancel{0} \\ - 7\ 6\ 2 \\ \hline 2\ 3\ 8 \end{array} \end{array}$$

$$\begin{array}{r} \text{Check: } \begin{array}{r} 238 \\ + 762 \\ \hline 1000 \end{array} \end{array}$$

$$\begin{array}{r} 5. \quad \begin{array}{r} 15,759 \\ - 458 \\ \hline 15,301 \end{array} \end{array}$$

The radius of Neptune is 15,301 miles.

$$\begin{array}{r} 6. \quad \begin{array}{r} 92 \\ - 47 \\ \hline 45 \end{array} \end{array}$$

The sale price of the suit is \$45.

Calculator Explorations

1. $865 - 95 = 770$
2. $76 - 27 = 49$
3. $147 - 38 = 109$
4. $366 - 87 = 279$
5. $9625 - 647 = 8978$
6. $10,711 - 8925 = 1786$

Vocabulary, Readiness & Video Check 1.4

1. The difference of any number and that same number is 0.
2. The difference of any number and 0 is the same number.
3. In $37 - 19 = 18$, the number 37 is the minuend, and the number 19 is the subtrahend.

4. In $37 - 19 = 18$, the number 18 is called the difference.
5. $6 - 6 = 0$
6. $93 - 93 = 0$
7. $600 - 0 = 600$
8. $5 - 0 = 5$
9. We cannot take 7 from 2 in the ones place, so we borrow one ten from the tens place and move it over to the ones place to give us $10 + 2$ or 12.
10. Order does not matter when adding, but order does matter when subtracting.

Exercise Set 1.4

2.
$$\begin{array}{r} 72 \\ - 41 \\ \hline 31 \end{array}$$
 Check:

$$\begin{array}{r} 31 \\ + 41 \\ \hline 72 \end{array}$$

4.
$$\begin{array}{r} 572 \\ - 321 \\ \hline 251 \end{array}$$
 Check:

$$\begin{array}{r} 251 \\ + 321 \\ \hline 572 \end{array}$$

6.
$$\begin{array}{r} 286 \\ - 45 \\ \hline 241 \end{array}$$
 Check:

$$\begin{array}{r} 241 \\ + 45 \\ \hline 286 \end{array}$$

8.
$$\begin{array}{r} 5766 \\ - 324 \\ \hline 5442 \end{array}$$
 Check:

$$\begin{array}{r} 5442 \\ + 324 \\ \hline 5766 \end{array}$$

10.
$$\begin{array}{r} 4912 \\ - 2610 \\ \hline 2302 \end{array}$$
 Check:

$$\begin{array}{r} 2302 \\ + 2610 \\ \hline 4912 \end{array}$$

12.
$$\begin{array}{r} 257 \\ - 257 \\ \hline 0 \end{array}$$
 Check:

$$\begin{array}{r} 0 \\ + 257 \\ \hline 257 \end{array}$$

14.
$$\begin{array}{r} 55 \\ - 29 \\ \hline 26 \end{array}$$
 Check:

$$\begin{array}{r} 26 \\ + 29 \\ \hline 55 \end{array}$$

16.
$$\begin{array}{r} 80 \\ - 37 \\ \hline 43 \end{array}$$
 Check:

$$\begin{array}{r} 43 \\ + 37 \\ \hline 80 \end{array}$$

18.
$$\begin{array}{r} 436 \\ - 275 \\ \hline 161 \end{array}$$
 Check:

$$\begin{array}{r} 161 \\ + 275 \\ \hline 436 \end{array}$$

20.
$$\begin{array}{r} 674 \\ - 299 \\ \hline 375 \end{array}$$
 Check:

$$\begin{array}{r} 375 \\ + 299 \\ \hline 674 \end{array}$$

$$\begin{array}{r} 22. \quad 300 \\ - 149 \\ \hline 151 \\ \text{Check:} \\ 11 \\ 151 \\ + 149 \\ \hline 300 \end{array}$$

$$\begin{array}{r} 24. \quad 773 \\ - 29 \\ \hline 744 \\ \text{Check:} \\ 1 \\ 744 \\ + 29 \\ \hline 773 \end{array}$$

$$\begin{array}{r} 26. \quad 813 \\ - 227 \\ \hline 586 \\ \text{Check:} \\ 11 \\ 586 \\ + 227 \\ \hline 813 \end{array}$$

$$\begin{array}{r} 28. \quad 5349 \\ - 720 \\ \hline 4629 \\ \text{Check:} \\ 1 \\ 4629 \\ + 720 \\ \hline 5349 \end{array}$$

$$\begin{array}{r} 30. \quad 724 \\ - 16 \\ \hline 708 \\ \text{Check:} \\ 1 \\ 708 \\ + 16 \\ \hline 724 \end{array}$$

$$\begin{array}{r} 32. \quad 300 \\ - 211 \\ \hline 89 \\ \text{Check:} \\ 11 \\ 89 \\ + 211 \\ \hline 300 \end{array}$$

$$\begin{array}{r} 34. \quad 1983 \\ - 1914 \\ \hline 69 \\ \text{Check:} \\ 1 \\ 69 \\ + 1914 \\ \hline 1983 \end{array}$$

$$\begin{array}{r} 36. \quad 76,652 \\ - 29,498 \\ \hline 47,154 \\ \text{Check:} \\ 1 \quad 11 \\ 47,154 \\ + 29,498 \\ \hline 76,652 \end{array}$$

$$\begin{array}{r} 38. \quad 40,000 \\ - 23,582 \\ \hline 16,418 \\ \text{Check:} \\ 11 \quad 11 \\ 16,418 \\ + 23,582 \\ \hline 40,000 \end{array}$$

$$\begin{array}{r} 40. \quad 6050 \\ - 1878 \\ \hline 4172 \\ \text{Check:} \\ 111 \\ 4172 \\ + 1878 \\ \hline 6050 \end{array}$$

$$\begin{array}{r} 42. \quad 62,222 \\ - 39,898 \\ \hline 22,324 \\ \text{Check:} \\ 11 \quad 11 \\ 22,324 \\ + 39,898 \\ \hline 62,222 \end{array}$$

$$\begin{array}{r} 44. \quad 21 \\ - 9 \\ \hline 12 \\ 21 \text{ subtract } 9 \text{ is } 12. \end{array}$$

$$\begin{array}{r} 46. \quad 16 \\ - 5 \\ \hline 11 \\ \text{The difference of } 16 \text{ and } 5 \text{ is } 11. \end{array}$$

$$\begin{array}{r} 48. \quad 59 \\ - 41 \\ \hline 18 \end{array}$$

59 subtract 41 is 18.

$$\begin{array}{r} 50. \quad 25 \\ - 12 \\ \hline 13 \end{array}$$

25 less 12 is 13.

$$\begin{array}{r} 52. \quad 90 \\ - 86 \\ \hline 4 \end{array}$$

86 subtracted from 90 is 4.

$$\begin{array}{r} 54. \quad 59,320 \\ - 55,492 \\ \hline 3,828 \end{array}$$

They traveled 3828 miles on their trip.

$$\begin{array}{r} 56. \quad 197 \\ - 98 \\ \hline 99 \end{array}$$

Kelp can grow 99 feet taller than bamboo.

$$\begin{array}{r} 58. \quad 164,000 \\ + 40,000 \\ \hline 204,000 \end{array}$$

The total U.S. land area drained by the Ohio and Tennessee sub-basins is 204,000 square miles.

$$\begin{array}{r} 60. \quad 189,000 \\ - 75,000 \\ \hline 114,000 \end{array}$$

The Upper Mississippi sub-basin drains 114,000 square miles more than the Lower Mississippi sub-basin.

$$\begin{array}{r} 62. \quad 68 \\ - 58 \\ \hline 10 \end{array}$$

The low temperature was 10° Fahrenheit.

$$\begin{array}{r} 64. \quad 713 \\ - 299 \\ \hline 414 \end{array}$$

She will have \$414 left in her savings account.

$$\begin{array}{r} 66. \quad 243 \\ - 185 \\ \hline 58 \end{array}$$

Pat's blood cholesterol level should be decreased by 58.

$$\begin{array}{r} 68. \quad 547 \\ - 99 \\ \hline 448 \end{array}$$

The sale price of the stereo is \$448.

$$\begin{array}{r} 70. \quad 38,708 \\ - 11,869 \\ \hline 26,839 \end{array}$$

There were 26,839 official participants for the 2013 Boston Marathon.

72. The shortest bar corresponds to the quietest reading. Leaves rustling is the quietest.

$$\begin{array}{r} 74. \quad 100 \\ - 70 \\ \hline 30 \end{array}$$

The difference in sound intensity between live rock music and loud television is 30 dB.

$$\begin{array}{r} 76. \quad 28,799 \\ - 13,205 \\ \hline 15,594 \end{array}$$

The number of tornadoes after 2000 was 15,594.

$$\begin{array}{r} 78. \quad 223 \\ - 27 \\ \hline 196 \end{array}$$

The increase in the number of California condors is 196.

80. Dallas/Ft. Worth International and Denver International airports have 60 million or fewer passengers per year.

$$\begin{array}{r} 82. \quad 94 \\ - 60 \\ \hline 34 \end{array}$$

Hartsfield-Jackson Atlanta International Airport has 34 million more passengers per year than the Dallas/Ft. Worth International Airport.

84. Student A Budget

$$\begin{array}{r} 1 \\ 600 \\ 200 \\ 150 \\ + 120 \\ \hline 1070 \end{array}$$

$$\begin{array}{r} 1200 \\ - 1070 \\ \hline 130 \end{array}$$

Student A would have an excess of \$130.

Student B Budget

$$\begin{array}{r}
 11 \\
 300 \\
 400 \\
 240 \\
 + 170 \\
 \hline
 1110
 \end{array}$$

$$\begin{array}{r}
 1200 \\
 - 1110 \\
 \hline
 90
 \end{array}$$

Student B would have an excess of \$90.

$$\begin{array}{r}
 86. \quad 986 \\
 - 48 \\
 \hline
 938
 \end{array}$$

$$\begin{array}{r}
 88. \quad 22 \\
 80 \\
 93 \\
 17 \\
 9 \\
 + 2 \\
 \hline
 201
 \end{array}$$

$$\begin{array}{r}
 90. \quad 10,000 \\
 - 1,786 \\
 \hline
 8,214
 \end{array}$$

$$\begin{array}{r}
 92. \quad 12,468 \\
 3,211 \\
 + 1,988 \\
 \hline
 17,667
 \end{array}$$

$$\begin{array}{r}
 94. \quad \text{In } 2863, 2863 \text{ is the minuend and } 1904 \text{ is the} \\
 - 1904 \\
 \hline
 \text{subtrahend.}
 \end{array}$$

96. In find 86 decreased by 25, 86 is the minuend and 25 is the subtrahend.

$$\begin{array}{r}
 98. \quad 478 \\
 - 89 \\
 \hline
 389
 \end{array}$$

The given answer is correct.

Check:

$$\begin{array}{r}
 1 \\
 389 \\
 + 89 \\
 \hline
 478
 \end{array}$$

$$\begin{array}{r}
 100. \quad 7615 \\
 - 547 \\
 \hline
 7068
 \end{array}$$

The given answer is incorrect.

Check:

$$\begin{array}{r}
 7068 \\
 + 547 \\
 \hline
 7615
 \end{array}$$

$$\begin{array}{r}
 102. \quad 10,244 \\
 - 8,534 \\
 \hline
 1,710
 \end{array}$$

104. answers may vary

Section 1.5 Practice Exercises

1. a. To round 57 to the nearest ten, observe that the digit in the ones place is 7. Since the digit is at least 5, we add 1 to the digit in the tens place. The number 57 rounded to the nearest ten is 60.
- b. To round 641 to the nearest ten, observe that the digit in the ones place is 1. Since the digit is less than 5, we do not add 1 to the digit in the tens place. The number 641 rounded to the nearest ten is 640.
- c. To round 325 to the nearest ten observe that the digit in the ones place is 5. Since the digit is at least 5, we add 1 to the digit in the tens place. The number 325 rounded to the nearest ten is 330.
2. a. To round 72,304 to the nearest thousand, observe that the digit in the hundreds place is 3. Since the digit is less than 5, we do not add 1 to the digit in the thousands place. The number 72,304 rounded to the nearest thousand is 72,000.
- b. To round 9222 to the nearest thousand, observe that the digit in the hundreds place is 2. Since the digit is less than 5, we do not add 1 to the digit in the thousands place. The number 9222 rounded to the nearest thousand is 9000.
- c. To round 671,800 to the nearest thousand, observe that the digit in the hundreds place is 8. Since this digit is at least 5, we add 1 to the digit in the thousands place. The number 671,800 rounded to the nearest thousand is 672,000.
3. a. To round 3474 to the nearest hundred, observe that the digit in the tens place is 7. Since this digit is at least 5, we add 1 to the digit in the hundreds place. The number 3474 rounded to the nearest hundred is 3500.

- b. To round 76,243 to the nearest hundred, observe that the digit in the tens place is 4. Since this digit is less than 5, we do not add 1 to the digit in the hundreds place. The number 76,243 rounded to the nearest hundred is 76,200.
- c. To round 978,965 to the nearest hundred, observe that the digit in the tens place is 6. Since this digit is at least 5, we add 1 to the digit in the hundreds place. The number 978,965 rounded to the nearest hundred is 979,000.

$$\begin{array}{rcl} 4. & 49 & \text{rounds to} & 50 \\ & 25 & \text{rounds to} & 30 \\ & 32 & \text{rounds to} & 30 \\ & 51 & \text{rounds to} & 50 \\ & 98 & \text{rounds to} & + 100 \\ \hline & & & 260 \end{array}$$

$$\begin{array}{rcl} 5. & 3785 & \text{rounds to} & 4000 \\ & - 2479 & \text{rounds to} & - 2000 \\ \hline & & & 2000 \end{array}$$

$$\begin{array}{rcl} 6. & 11 & \text{rounds to} & 10 \\ & 16 & \text{rounds to} & 20 \\ & 19 & \text{rounds to} & 20 \\ & + 31 & \text{rounds to} & + 30 \\ \hline & & & 80 \end{array}$$

The total distance is approximately 80 miles.

$$\begin{array}{rcl} 7. & 139 & \text{rounds to} & 100 \\ & 316 & \text{rounds to} & 300 \\ & + 1842 & \text{rounds to} & + 1800 \\ \hline & & & 2200 \end{array}$$

The total number of threatened species in Ecuador was approximately 2200.

Vocabulary, Readiness & Video Check 1.5

1. To graph a number on a number line, darken the point representing the location of the number.
2. Another word for approximating a whole number is rounding.
3. The number 65 rounded to the nearest ten is 70 but the number 61 rounded to the nearest ten is 60.
4. An exact number of products is 1265, but an estimate is 1000.

5. 3 is in the place we're rounding to (tens), and the digit to the right of this place is 5 or greater, so we need to add 1 to the 3.
6. On a number line, 22 is closer to 20 than 30. Thus, 22 rounded to the nearest ten is 20.
7. Each circled digit is to the right of the place value being rounded to and is used to determine whether or not we add 1 to the digit in the place value being rounded to.

Exercise Set 1.5

2. To round 273 to the nearest ten, observe that the digit in the ones place is 3. Since this digit is less than 5, we do not add 1 to the digit in the tens place. The number 273 rounded to the nearest ten is 270.
4. To round 846 to the nearest ten, observe that the digit in the ones place is 6. Since this digit is at least 5, we add 1 to the digit in the tens place. The number 846 rounded to the nearest ten is 850.
6. To round 8494 to the nearest hundred, observe that the digit in the tens place is 9. Since this digit is at least 5, we add 1 to the digit in the hundreds place. The number 8494 rounded to the nearest hundred is 8500.
8. To round 898 to the nearest ten, observe that the digit in the ones place is 8. Since this digit is at least 5, we add 1 to the digit in the tens place. The number 898 rounded to the nearest ten is 900.
10. To round 82,198 to the nearest thousand, observe that the digit in the hundreds place is 1. Since this digit is less than 5, we do not add 1 to the digit in the thousands place. The number 82,198 rounded to the nearest thousand is 82,000.
12. To round 42,682 to the nearest ten-thousand, observe that the digit in the thousands place is 2. Since this digit is less than 5, we do not add 1 to the digit in the ten-thousands place. The number 42,682 rounded to the nearest ten-thousand is 40,000.
14. To round 179,406 to the nearest hundred, observe that the digit in the tens place is 0. Since this digit is less than 5, we do not add 1 to the digit in the hundreds place. The number 179,406 rounded to the nearest hundred is 179,400.

- 16.** To round 96,501 to the nearest thousand, observe that the digit in the hundreds place is 5. Since this digit is at least 5, we add 1 to the digit in the thousands place. The number 96,501 rounded to the nearest thousand is 97,000.
- 18.** To round 99,995 to the nearest ten, observe that the digit in the ones place is 5. Since this digit is at least 5, we add 1 to the digit in the tens place. The number 99,995 rounded to the nearest ten is 100,000.
- 20.** To round 39,523,698 to the nearest million, observe that the digit in the hundred-thousands place is 5. Since this digit is at least 5, we add 1 to the digit in the millions place. The number 39,523,698 rounded to the nearest million is 40,000,000.
- 22.** Estimate 7619 to a given place value by rounding it to that place value. 7619 rounded to the tens place is 7620, to the hundreds place is 7600, and to the thousands place is 8000.
- 24.** Estimate 7777 to a given place value by rounding it to that place value. 7777 rounded to the tens place is 7780, to the hundreds place is 7800, and to the thousands place is 8000.
- 26.** Estimate 85,049 to a given place value by rounding it to that place value. 85,049 rounded to the tens place is 85,050, to the hundreds place is 85,000, and to the thousands place is 85,000.
- 28.** To round 12,997 to the nearest thousand, observe that the digit in the hundreds place is 9. Since this digit is at least 5, we add 1 to the digit in the thousands place. Therefore, 12,997 restaurants rounded to the nearest thousand is 13,000 restaurants.
- 30.** To round 60,149 to the nearest hundred, observe that the digit in the tens place is 4. Since this digit is less than 5, we do not add 1 to the digit in the hundreds place. Therefore, 60,149 days rounded to the nearest hundred is 60,100 days.
- 32.** To round 316,797,189 to the nearest million, observe that the digit in the hundred-thousands place is 7. Since this digit is at least 5, we add 1 to the digit in the millions place. Therefore, 316,797,189 rounded to the nearest million is 317,000,000.
- 34.** To round 84,167,000,000 to the nearest billion, observe that the digit in the hundred-millions place is 1. Since this digit is less than 5, we do not add 1 to the digit in the billions place. Therefore, \$84,167,000,000 rounded to the nearest billion is \$84,000,000,000.
- 36.** To round 3,149,166,000 to the nearest ten-million, observe that the digit in the millions place is 9. Since this digit is at least 5, we add 1 to the digit in the ten-millions place. Therefore, 3,149,166,000 bushels rounded to the nearest ten-million is 3,150,000,000 bushels.
- 38.**
- | | | |
|-------------|-----------|-------------|
| 52 | rounds to | 50 |
| 33 | rounds to | 30 |
| 15 | rounds to | 20 |
| <u>+ 29</u> | rounds to | <u>+ 30</u> |
| | | 130 |
- 40.**
- | | | |
|--------------|-----------|--------------|
| 555 | rounds to | 560 |
| <u>- 235</u> | rounds to | <u>- 240</u> |
| | | 320 |
- 42.**
- | | | |
|---------------|-----------|---------------|
| 4050 | rounds to | 4100 |
| 3133 | rounds to | 3100 |
| <u>+ 1220</u> | rounds to | <u>+ 1200</u> |
| | | 8400 |
- 44.**
- | | | |
|---------------|-----------|---------------|
| 1989 | rounds to | 2000 |
| <u>- 1870</u> | rounds to | <u>- 1900</u> |
| | | 100 |
- 46.**
- | | | |
|--------------|-----------|--------------|
| 799 | rounds to | 800 |
| 1655 | rounds to | 1700 |
| <u>+ 271</u> | rounds to | <u>+ 300</u> |
| | | 2800 |
- 48.** $522 + 785$ is approximately $520 + 790 = 1310$. The answer of 1307 is correct.
- 50.** $542 + 789 + 198$ is approximately $540 + 790 + 200 = 1530$. The answer of 2139 is incorrect.
- 52.** $5233 + 4988$ is approximately $5200 + 5000 = 10,200$. The answer of 9011 is incorrect.

54. $\begin{array}{r} 89 \text{ rounds to } 90 \\ 97 \text{ rounds to } 100 \\ 100 \text{ rounds to } 100 \\ 79 \text{ rounds to } 80 \\ 75 \text{ rounds to } 80 \\ + 82 \text{ rounds to } + 80 \\ \hline 530 \end{array}$

The total score is approximately 530.

56. $\begin{array}{r} 588 \text{ rounds to } 600 \\ 689 \text{ rounds to } 700 \\ 277 \text{ rounds to } 300 \\ 143 \text{ rounds to } 100 \\ 59 \text{ rounds to } 100 \\ + 802 \text{ rounds to } + 800 \\ \hline 2600 \end{array}$

The total distance is approximately 2600 miles.

58. $\begin{array}{r} 1895 \text{ rounds to } 1900 \\ - 1524 \text{ rounds to } - 1500 \\ \hline 400 \end{array}$

The difference in price is approximately \$400.

60. $\begin{array}{r} 64 \text{ rounds to } 60 \\ 41 \text{ rounds to } 40 \\ + 133 \text{ rounds to } + 130 \\ \hline 230 \end{array}$

The total distance is approximately 230 miles.

62. $\begin{array}{r} 51,746 \text{ rounds to } 52,000 \\ - 49,713 \text{ rounds to } - 50,000 \\ \hline 2,000 \end{array}$

The increase was approximately 2000 credit hours.

64. 2989 million dollars written in standard form is \$2,989,000,000. \$2,989,000,000 rounded to the nearest ten-million is \$2,990,000,000. \$2,989,000,000 rounded to the nearest hundred-million is \$3,000,000,000.

66. 2381 million dollars written in standard form is \$2,381,000,000. \$2,381,000,000 rounded to the nearest ten-million is \$2,380,000,000. \$2,381,000,000 rounded to the nearest hundred-million is \$2,400,000,000.

68. 5698, for example, rounded to the nearest ten is 5700.

70. The largest possible number that rounds to 1,500,000 when rounded to the nearest hundred-thousand is 1,549,999.

72. answers may vary

74. $\begin{array}{r} 5950 \text{ rounds to } 6,000 \\ 7693 \text{ rounds to } 7,700 \\ + 8203 \text{ rounds to } + 8,200 \\ \hline 21,900 \end{array}$

The perimeter is approximately 21,900 miles.

Section 1.6 Practice Exercises

1. a. $3 \times 0 = 0$

b. $4(1) = 4$

c. $(0)(34) = 0$

d. $1 \cdot 76 = 76$

2. a. $5(2 + 3) = 5 \cdot 2 + 5 \cdot 3$

b. $9(8 + 7) = 9 \cdot 8 + 9 \cdot 7$

c. $3(6 + 1) = 3 \cdot 6 + 3 \cdot 1$

3. a. $\begin{array}{r} 2 \\ 36 \\ \times 4 \\ \hline 144 \end{array}$

b. $\begin{array}{r} 21 \\ 132 \\ \times 9 \\ \hline 1188 \end{array}$

4. a. $\begin{array}{r} 594 \\ \times 72 \\ \hline 1188 \\ 41580 \\ \hline 42,768 \end{array}$

b. $\begin{array}{r} 306 \\ \times 81 \\ \hline 306 \\ 24480 \\ \hline 24,786 \end{array}$

$$\begin{array}{r} 5. \text{ a. } \quad 726 \\ \times 142 \\ \hline 1452 \\ 29040 \\ 72600 \\ \hline 103,092 \end{array}$$

$$\begin{array}{r} \text{b. } \quad 288 \\ \times 4 \\ \hline 1152 \end{array}$$

$$6. 75 \cdot 100 = 7500$$

$$7. 808 \cdot 1000 = 808,000$$

$$\begin{array}{r} 8. \quad 35 \\ \times 3 \\ \hline 105 \end{array}$$

$35 \cdot 3000 = 105,000$
Attach 3 zeros.

$$9. 600 \cdot 600 = 360,000$$

$$\begin{aligned} 10. \text{ Area} &= \text{length} \cdot \text{width} \\ &= (360 \text{ miles})(280 \text{ miles}) \\ &= 100,800 \text{ square miles} \end{aligned}$$

The area of Wyoming is 100,800 square miles.

$$\begin{array}{r} 11. \quad 16 \\ \times 45 \\ \hline 80 \\ 640 \\ \hline 720 \end{array}$$

The printer can print 720 pages in 45 minutes.

$$\begin{array}{r} 12. \quad 8 \times 11 = 88 \\ \quad 5 \times 9 = 45 \\ \quad \quad \quad 1 \\ \quad \quad \quad 88 \\ \quad \quad + 45 \\ \quad \quad \hline \quad \quad 133 \end{array}$$

The total cost is \$133.

$$\begin{array}{r} 13. \quad 163 \text{ rounds to } 200 \\ \times 391 \text{ rounds to } \times 400 \\ \hline \quad \quad 80,000 \end{array}$$

There are approximately 80,000 words on 391 pages.

Calculator Explorations

$$1. 72 \times 48 = 3456$$

$$2. 81 \times 92 = 7452$$

$$3. 163 \cdot 94 = 15,322$$

$$4. 285 \cdot 144 = 41,040$$

$$5. 983(277) = 272,291$$

$$6. 1562(843) = 1,316,766$$

Vocabulary, Readiness & Video Check 1.6

- The product of 0 and any number is 0.
- The product of 1 and any number is the number.
- In $8 \cdot 12 = 96$, the 96 is called the product and 8 and 12 are each called a factor.
- Since $9 \cdot 10 = 10 \cdot 9$, we say that changing the order in multiplication does not change the product. This property is called the commutative property of multiplication.
- Since $(3 \cdot 4) \cdot 6 = 3 \cdot (4 \cdot 6)$, we say that changing the grouping in multiplication does not change the product. This property is called the associative property of multiplication.
- Area measures the amount of surface of a region.
- Area of a rectangle = length \cdot width.
- We know $9(10 + 8) = 9 \cdot 10 + 9 \cdot 8$ by the distributive property.
- distributive property
- To show that 8649 is actually multiplied by 70 and not by just 7.
- Think of the problem as 50 times 9 and then attach the two zeros from 900, or think of the problem as 5 times 9 and then attach the three zeros at the end of 50 and 900. Both approaches give us 45,000.
- Area is measured in square units, and here we have meters times meters, or square meters; the answer is 63 *square* meters.
- Multiplication is also an application of addition since it is addition of the same addend.

Exercise Set 1.6

$$2. 55 \cdot 1 = 55$$

$$4. 27 \cdot 0 = 0$$

6. $7 \cdot 6 \cdot 0 = 0$

8. $1 \cdot 41 = 41$

10. $5(8 + 2) = 5 \cdot 8 + 5 \cdot 2$

12. $6(1 + 4) = 6 \cdot 1 + 6 \cdot 4$

14. $12(12 + 3) = 12 \cdot 12 + 12 \cdot 3$

16.
$$\begin{array}{r} 79 \\ \times 3 \\ \hline 237 \end{array}$$

18.
$$\begin{array}{r} 638 \\ \times 5 \\ \hline 3190 \end{array}$$

20.
$$\begin{array}{r} 882 \\ \times 2 \\ \hline 1764 \end{array}$$

22.
$$\begin{array}{r} 9021 \\ \times 3 \\ \hline 27,063 \end{array}$$

24.
$$\begin{array}{r} 91 \\ \times 72 \\ \hline 182 \\ 6370 \\ \hline 6552 \end{array}$$

26.
$$\begin{array}{r} 526 \\ \times 23 \\ \hline 1578 \\ 10520 \\ \hline 12,098 \end{array}$$

28.
$$\begin{array}{r} 708 \\ \times 21 \\ \hline 708 \\ 14160 \\ \hline 14,868 \end{array}$$

30.
$$\begin{array}{r} 720 \\ \times 80 \\ \hline 57,600 \end{array}$$

32. $(593)(47)(0) = 0$

34. $(240)(1)(20) = (240)(20) = 4800$

36.
$$\begin{array}{r} 1357 \\ \times 79 \\ \hline 12213 \\ 94990 \\ \hline 107,203 \end{array}$$

38.
$$\begin{array}{r} 807 \\ \times 127 \\ \hline 5649 \\ 16140 \\ 80700 \\ \hline 102,489 \end{array}$$

40.
$$\begin{array}{r} 1234 \\ \times 567 \\ \hline 8638 \\ 74040 \\ 617000 \\ \hline 699,678 \end{array}$$

42.
$$\begin{array}{r} 426 \\ \times 110 \\ \hline 4260 \\ 42600 \\ \hline 46,860 \end{array}$$

44.
$$\begin{array}{r} 1876 \\ \times 1407 \\ \hline 13132 \\ 750400 \\ 1876000 \\ \hline 2,639,532 \end{array}$$

46. $6 \times 100 = 600$

48. $26 \times 1000 = 26,000$

50. $9054 \cdot 10 = 90,540$

52. $3 \cdot 9 = 27$
 $3 \cdot 9000 = 27,000$
(attach 3 zeros)

54. $7 \cdot 3 = 21$
 $70 \cdot 300 = 21,000$
(attach 3 zeros)

56. $27 \cdot 5 = 135$
 $27 \cdot 50,000 = 1,350,000$
(attach 4 zeros)

58. Area = (length)(width)
 = (13 inches)(3 inches)
 = 39 square inches

Perimeter = length + width + length + width
 = 13 + 3 + 13 + 3
 = 32 inches

60. Area = (length)(width)
 = (25 centimeters)(20 centimeters)
 = 500 square centimeters

Perimeter = length + width + length + width
 = 25 + 20 + 25 + 20
 = 90 centimeters

62.
$$\begin{array}{r} 982 \\ \times 650 \\ \hline \end{array}$$
 rounds to
$$\begin{array}{r} 1000 \\ \times 700 \\ \hline 700,000 \end{array}$$

64.
$$\begin{array}{r} 111 \\ \times 999 \\ \hline \end{array}$$
 rounds to
$$\begin{array}{r} 100 \\ \times 1000 \\ \hline 100,000 \end{array}$$

66. 2872×12 is approximately 2872×10 , which is 28,720.
 The best estimate is b.

68. 706×409 is approximately 700×400 , which is 280,000.
 The best estimate is d.

70. $70 \times 12 = (7 \times 10) \times 12$
 = $7 \times (10 \times 12)$
 = 7×120
 = 840

72. $9 \times 900 = 8100$

74.
$$\begin{array}{r} 3310 \\ \times 3 \\ \hline 9930 \end{array}$$

76.
$$\begin{array}{r} 14 \\ \times 8 \\ \hline 112 \end{array}$$

 There are 112 grams of fat in 8 ounces of hulled sunflower seeds.

78.
$$\begin{array}{r} 34 \\ \times 14 \\ \hline 136 \\ 340 \\ \hline 476 \end{array}$$

There are 476 seats in the room.

80. a. $5 \times 4 = 20$
 There are 20 apartments on one floor.

b.
$$\begin{array}{r} 20 \\ \times 3 \\ \hline 60 \end{array}$$

 There are 60 apartments in the building.

82. Area = (length)(width)
 = (60 feet)(45 feet)
 = 2700 square feet

The area is 2700 square feet.

84. Area = (length)(width)
 = (776 meters)(639 meters)
 = 495,864 square meters

The area is 495,864 square meters.

86.
$$\begin{array}{r} 700 \\ \times 17 \\ \hline 4900 \\ 7000 \\ \hline 11,900 \end{array}$$

 The 17 discs hold 11,900 MB.

88.
$$\begin{array}{r} 365 \\ \times 3 \\ \hline 1095 \end{array}$$

 A cow eats 1095 pounds of grain each year.

90.
$$\begin{array}{r} 14 \\ \times 16 \\ \hline 84 \\ 140 \\ \hline 224 \end{array}$$

 There are 224 grams of fat in 16 ounces.

Person	Number of persons	Cost per person	Cost per Category
Student	24	\$5	\$120
Nonstudent	4	\$7	\$28
Children under 12	5	\$2	\$10
Total Cost			\$158

94. $14 \times 3 = 42$

There were 42 million “older” Americans in 2012.

96.
$$\begin{array}{r} 126 \\ - 8 \\ \hline 118 \end{array}$$

98. $47 + 26 + 10 + 231 + 50 = 364$

100.
$$\begin{array}{r} 19 \\ \times 4 \\ \hline 76 \end{array}$$

The product of 19 and 4 is 76.

102.
$$\begin{array}{r} 19 \\ + 4 \\ \hline 23 \end{array}$$

The total of 19 and 4 is 23.

104. $11 + 11 + 11 + 11 + 11 + 11 = 6 \cdot 11$ or $11 \cdot 6$

106. a. $4 \cdot 5 = 5 + 5 + 5 + 5$ or $4 + 4 + 4 + 4 + 4$

b. answers may vary

108.
$$\begin{array}{r} 31 \\ \times 50 \\ \hline 1550 \end{array}$$

110. $57 \times 3 = 171$

$57 \times 6 = 342$

The problem is
$$\begin{array}{r} 57 \\ \times 63 \\ \hline \end{array}$$

112. answers may vary

114. $3 \times 139 = 417$

$2 \times 592 = 1184$

$417 + 1184 + 679 = 2280$

Kevin Durant scored 2280 points during the 2012–2013 regular season.

Section 1.7 Practice Exercises

1. a. $9 \overline{)72}^8$ because $8 \cdot 9 = 72$.

b. $40 \div 5 = 8$ because $8 \cdot 5 = 40$.

c. $\frac{24}{6} = 4$ because $4 \cdot 6 = 24$.

2. a. $\frac{7}{7} = 1$ because $1 \cdot 7 = 7$.

b. $5 \div 1 = 5$ because $5 \cdot 1 = 5$.

c. $1 \overline{)11}$ because $11 \cdot 1 = 11$.

d. $4 \div 1 = 4$ because $4 \cdot 1 = 4$.

e. $\frac{10}{1} = 10$ because $10 \cdot 1 = 10$.

f. $21 \div 21 = 1$ because $1 \cdot 21 = 21$.

3. a. $\frac{0}{7} = 0$ because $0 \cdot 7 = 0$.

b. $8 \overline{)0}^0$ because $0 \cdot 8 = 0$.

c. $7 \div 0$ is undefined because if $7 \div 0$ is a number, then the number times 0 would be 7.

d. $0 \div 14 = 0$ because $0 \cdot 14 = 0$.

4. a.
$$\begin{array}{r} 818 \\ 6 \overline{)4908} \\ \underline{-48} \\ 10 \\ \underline{-6} \\ 48 \\ \underline{-48} \\ 0 \end{array}$$

Check: 818

$$\begin{array}{r} \times 6 \\ \hline 4908 \end{array}$$

$$\begin{array}{r} \text{b. } 4 \overline{) 2212} \\ \underline{-20} \\ 21 \\ \underline{-20} \\ 12 \\ \underline{-12} \\ 0 \end{array}$$

$$\begin{array}{r} \text{Check: } 553 \\ \times 4 \\ \hline 2212 \end{array}$$

$$\begin{array}{r} \text{c. } 3 \overline{) 753} \\ \underline{-6} \\ 15 \\ \underline{-15} \\ 03 \\ \underline{-3} \\ 0 \end{array}$$

$$\begin{array}{r} \text{Check: } 251 \\ \times 3 \\ \hline 753 \end{array}$$

$$\begin{array}{r} \text{5. a. } 7 \overline{) 2128} \\ \underline{-21} \\ 02 \\ \underline{-0} \\ 28 \\ \underline{-28} \\ 0 \end{array}$$

$$\text{Check: } 304 \times 7 = 2128$$

$$\begin{array}{r} \text{b. } 9 \overline{) 45,900} \\ \underline{-45} \\ 09 \\ \underline{-9} \\ 000 \end{array}$$

$$\text{Check: } 5100 \times 9 = 45,900$$

$$\begin{array}{r} \text{6. a. } 4 \overline{) 939} \text{ R } 3 \\ \underline{-8} \\ 13 \\ \underline{-12} \\ 19 \\ \underline{-16} \\ 3 \end{array}$$

$$\text{Check: } 234 \cdot 4 + 3 = 939$$

$$\begin{array}{r} \text{b. } 5 \overline{) 3287} \text{ R } 2 \\ \underline{-30} \\ 28 \\ \underline{-25} \\ 37 \\ \underline{-35} \\ 2 \end{array}$$

$$\text{Check: } 657 \cdot 5 + 2 = 3287$$

$$\begin{array}{r} \text{7. a. } 9 \overline{) 81,605} \text{ R } 2 \\ \underline{-81} \\ 06 \\ \underline{-0} \\ 60 \\ \underline{-54} \\ 65 \\ \underline{-63} \\ 2 \end{array}$$

$$\text{Check: } 9067 \cdot 9 + 2 = 81,605$$

$$\begin{array}{r} \text{b. } 4 \overline{) 23,310} \text{ R } 2 \\ \underline{-20} \\ 33 \\ \underline{-32} \\ 11 \\ \underline{-8} \\ 30 \\ \underline{-28} \\ 2 \end{array}$$

$$\text{Check: } 5827 \cdot 4 + 2 = 23,310$$

$$\begin{array}{r}
 524 \text{ R } 12 \\
 8. \quad 17 \overline{) 8920} \\
 \underline{-85} \\
 42 \\
 \underline{-34} \\
 80 \\
 \underline{-68} \\
 12
 \end{array}$$

$$\begin{array}{r}
 49 \text{ R } 60 \\
 9. \quad 678 \overline{) 33,282} \\
 \underline{-27} \\
 6 \\
 \underline{-6} \\
 60
 \end{array}$$

$$\begin{array}{r}
 57 \\
 10. \quad 3 \overline{) 171} \\
 \underline{-15} \\
 21 \\
 \underline{-21} \\
 0
 \end{array}$$

Each student got 57 CDs.

$$\begin{array}{r}
 44 \\
 11. \quad 12 \overline{) 532} \\
 \underline{-48} \\
 52 \\
 \underline{-48} \\
 4
 \end{array}$$

There will be 44 full boxes and 4 printers left over.

12. Find the sum and divide by 7.

$$\begin{array}{r}
 4 \\
 7 \\
 35 \\
 16 \\
 9 \\
 3 \\
 + 52 \\
 \hline
 126
 \end{array}
 \qquad
 \begin{array}{r}
 18 \\
 7 \overline{) 126} \\
 \underline{-7} \\
 56 \\
 \underline{-56} \\
 0
 \end{array}$$

The average time is 18 minutes.

Calculator Explorations

1. $848 \div 16 = 53$
2. $564 \div 12 = 47$

$$3. \quad 5890 \div 95 = 62$$

$$4. \quad 1053 \div 27 = 39$$

$$5. \quad \frac{32,886}{126} = 261$$

$$6. \quad \frac{143,088}{264} = 542$$

$$7. \quad 0 \div 315 = 0$$

$$8. \quad 315 \div 0 \text{ is an error.}$$

Vocabulary, Readiness & Video Check 1.7

1. In $90 \div 2 = 45$, the answer 45 is called the quotient, 90 is called the dividend, and 2 is called the divisor.
2. The quotient of any number and 1 is the same number.
3. The quotient of any number (except 0) and the same number is 1.
4. The quotient of 0 and any number (except 0) is 0.
5. The quotient of any number and 0 is undefined.
6. The average of a list of numbers is the sum of the numbers divided by the number of numbers.
7. 0
8. zero; this zero becomes a placeholder in the quotient
9. $202 \cdot 102 + 15 = 20,619$
10. This tells us we have a division problem since division is used to separate a quantity into equal parts.
11. addition and division

Exercise Set 1.7

$$2. \quad 72 \div 9 = 8$$

$$4. \quad 24 \div 3 = 8$$

$$6. \quad 0 \div 4 = 0$$

$$8. \quad 38 \div 1 = 38$$

$$10. \frac{49}{49} = 1$$

$$12. \frac{45}{9} = 5$$

$$14. \frac{12}{0} \text{ is undefined}$$

$$16. 6 \div 6 = 1$$

$$18. 7 \div 0 \text{ is undefined}$$

$$20. 18 \div 3 = 6$$

$$22. \begin{array}{r} 17 \\ 5 \overline{) 85} \\ \underline{-5} \\ 35 \\ \underline{-35} \\ 0 \end{array}$$

$$\text{Check: } 17 \cdot 5 = 85$$

$$24. \begin{array}{r} 80 \\ 8 \overline{) 640} \\ \underline{-64} \\ 00 \end{array}$$

$$\text{Check: } 80 \cdot 8 = 640$$

$$26. \begin{array}{r} 526 \\ 4 \overline{) 2104} \\ \underline{-20} \\ 10 \\ \underline{-8} \\ 24 \\ \underline{-24} \\ 0 \end{array}$$

$$\text{Check: } 526 \cdot 4 = 2104$$

$$28. \frac{0}{30} = 0$$

$$\text{Check: } 0 \cdot 30 = 0$$

$$30. \begin{array}{r} 7 \\ 8 \overline{) 56} \\ \underline{-56} \\ 0 \end{array}$$

$$\text{Check: } 7 \cdot 8 = 56$$

$$32. \begin{array}{r} 11 \\ 11 \overline{) 121} \\ \underline{-11} \\ 11 \\ \underline{-11} \\ 0 \end{array}$$

$$\text{Check: } 11 \cdot 11 = 121$$

$$34. \begin{array}{r} 60 \text{ R } 6 \\ 7 \overline{) 426} \\ \underline{-42} \\ 06 \end{array}$$

$$\text{Check: } 60 \cdot 7 + 6 = 426$$

$$36. \begin{array}{r} 413 \text{ R } 1 \\ 3 \overline{) 1240} \\ \underline{-12} \\ 04 \\ \underline{-3} \\ 10 \\ \underline{-9} \\ 1 \end{array}$$

$$\text{Check: } 413 \cdot 3 + 1 = 1240$$

$$38. \begin{array}{r} 55 \text{ R } 2 \\ 3 \overline{) 167} \\ \underline{-15} \\ 17 \\ \underline{-15} \\ 2 \end{array}$$

$$\text{Check: } 55 \cdot 3 + 2 = 167$$

$$40. \begin{array}{r} 833 \text{ R } 1 \\ 4 \overline{) 3333} \\ \underline{-32} \\ 13 \\ \underline{-12} \\ 13 \\ \underline{-12} \\ 1 \end{array}$$

$$\text{Check: } 833 \cdot 4 + 1 = 3333$$

$$42. \begin{array}{r} 32 \\ 23 \overline{) 736} \\ \underline{-69} \\ 46 \\ \underline{-46} \\ 0 \end{array}$$

$$\text{Check: } 32 \cdot 23 = 736$$

$$\begin{array}{r}
 48 \\
 44 \overline{) 2016} \\
 \underline{-168} \\
 336 \\
 \underline{-336} \\
 0
 \end{array}$$

Check: $48 \cdot 42 = 2016$

$$\begin{array}{r}
 44 \text{ R } 2 \\
 44 \overline{) 1938} \\
 \underline{-176} \\
 178 \\
 \underline{-176} \\
 2
 \end{array}$$

Check: $44 \cdot 44 + 2 = 1938$

$$\begin{array}{r}
 612 \text{ R } 10 \\
 12 \overline{) 7354} \\
 \underline{-72} \\
 15 \\
 \underline{-12} \\
 34 \\
 \underline{-24} \\
 10
 \end{array}$$

Check: $612 \cdot 12 + 10 = 7354$

$$\begin{array}{r}
 405 \\
 14 \overline{) 5670} \\
 \underline{-56} \\
 07 \\
 \underline{-0} \\
 70 \\
 \underline{-70} \\
 0
 \end{array}$$

Check: $405 \cdot 14 = 5670$

$$\begin{array}{r}
 39 \text{ R } 9 \\
 64 \overline{) 2505} \\
 \underline{-192} \\
 585 \\
 \underline{-576} \\
 9
 \end{array}$$

Check: $39 \cdot 64 + 9 = 2505$

$$\begin{array}{r}
 47 \\
 123 \overline{) 5781} \\
 \underline{-492} \\
 861 \\
 \underline{-861} \\
 0
 \end{array}$$

Check: $47 \cdot 123 = 5781$

$$\begin{array}{r}
 96 \text{ R } 52 \\
 240 \overline{) 23,092} \\
 \underline{-2160} \\
 1492 \\
 \underline{-1440} \\
 52
 \end{array}$$

Check: $96 \cdot 240 + 52 = 23,092$

$$\begin{array}{r}
 201 \text{ R } 50 \\
 203 \overline{) 40,853} \\
 \underline{-406} \\
 25 \\
 \underline{-0} \\
 253 \\
 \underline{-203} \\
 50
 \end{array}$$

Check: $201 \cdot 203 + 50 = 40,853$

$$\begin{array}{r}
 303 \text{ R } 63 \\
 543 \overline{) 164,592} \\
 \underline{-1629} \\
 169 \\
 \underline{-0} \\
 1692 \\
 \underline{-1629} \\
 63
 \end{array}$$

Check: $303 \cdot 543 + 63 = 164,592$

$$\begin{array}{r}
 13 \\
 8 \overline{) 104} \\
 \underline{-8} \\
 24 \\
 \underline{-24} \\
 0
 \end{array}$$

$$\begin{array}{r}
 603 \text{ R } 2 \\
 64. \quad 5 \overline{) 3017} \\
 \underline{-30} \\
 01 \\
 \underline{-0} \\
 17 \\
 \underline{-15} \\
 2
 \end{array}$$

$$\begin{array}{r}
 1714 \text{ R } 47 \\
 66. \quad 50 \overline{) 85,747} \\
 \underline{-50} \\
 357 \\
 \underline{-350} \\
 74 \\
 \underline{-50} \\
 247 \\
 \underline{-200} \\
 47
 \end{array}$$

$$\begin{array}{r}
 3 \text{ } 040 \\
 68. \quad 214 \overline{) 650,560} \\
 \underline{-642} \\
 85 \\
 \underline{-0} \\
 856 \\
 \underline{-856} \\
 00 \\
 \underline{-0} \\
 0
 \end{array}$$

$$\begin{array}{r}
 13 \text{ R } 3 \\
 70. \quad 7 \overline{) 94} \\
 \underline{-7} \\
 24 \\
 \underline{-21} \\
 3
 \end{array}$$

The quotient is 13 R 3.

$$\begin{array}{r}
 3 \text{ R } 20 \\
 72. \quad 32 \overline{) 116} \\
 \underline{-96} \\
 20
 \end{array}$$

116 divided by 32 is 3 R 20.

$$\begin{array}{r}
 15 \text{ R } 3 \\
 74. \quad 5 \overline{) 78} \\
 \underline{-5} \\
 28 \\
 \underline{-25} \\
 3
 \end{array}$$

The quotient is 15 R 3.

$$\begin{array}{r}
 58 \\
 76. \quad 85 \overline{) 4930} \\
 \underline{-425} \\
 680 \\
 \underline{-680} \\
 0
 \end{array}$$

There are 58 students in the group.

$$\begin{array}{r}
 252000 \\
 78. \quad 21 \overline{) 5292000} \\
 \underline{-42} \\
 109 \\
 \underline{-105} \\
 42 \\
 \underline{-42} \\
 0
 \end{array}$$

Each person received \$252,000.

$$\begin{array}{r}
 412 \\
 80. \quad 14 \overline{) 5768} \\
 \underline{-56} \\
 16 \\
 \underline{-14} \\
 28 \\
 \underline{-28} \\
 0
 \end{array}$$

The truck hauls 412 bushels on each trip.

$$82. \text{ Lane divider} = 25 + 25 = 50$$

$$\begin{array}{r}
 105 \\
 50 \overline{) 5280} \\
 \underline{-50} \\
 28 \\
 \underline{-0} \\
 280 \\
 \underline{-250} \\
 30
 \end{array}$$

There are 105 whole lane dividers.

$$\begin{array}{r}
 23 \text{ R } 1 \\
 8 \overline{) 185} \\
 \underline{-16} \\
 25 \\
 \underline{-24} \\
 1
 \end{array}$$

Yes, she has enough for a 22-student class.
There is one 8-foot length and 1 additional foot of rope left over. That is, she has 9 feet of extra rope.

$$\begin{array}{r}
 17 \\
 6 \overline{) 102} \\
 \underline{-6} \\
 42 \\
 \underline{-42} \\
 0
 \end{array}$$

Arian Foster made 17 touchdowns during 2012.

$$\begin{array}{r}
 16 \\
 320 \overline{) 5280} \\
 \underline{-320} \\
 2080 \\
 \underline{-1920} \\
 160
 \end{array}$$

There are 16 whole feet in 1 rod.

$$\begin{array}{r}
 3 \\
 37 \\
 26 \\
 15 \\
 29 \\
 51 \\
 + 22 \\
 \hline
 180
 \end{array}
 \qquad
 \begin{array}{r}
 30 \\
 6 \overline{) 180} \\
 \underline{-18} \\
 00
 \end{array}$$

$$\text{Average} = \frac{180}{6} = 30$$

$$\begin{array}{r}
 21 \\
 121 \\
 200 \\
 185 \\
 176 \\
 + 163 \\
 \hline
 845
 \end{array}
 \qquad
 \begin{array}{r}
 169 \\
 5 \overline{) 845} \\
 \underline{-5} \\
 34 \\
 \underline{-30} \\
 45 \\
 \underline{-45} \\
 0
 \end{array}$$

$$\text{Average} = \frac{845}{5} = 169$$

$$\begin{array}{r}
 2 \\
 92 \\
 96 \\
 90 \\
 85 \\
 92 \\
 + 79 \\
 \hline
 534
 \end{array}
 \qquad
 \begin{array}{r}
 89 \\
 6 \overline{) 534} \\
 \underline{-48} \\
 54 \\
 \underline{-54} \\
 0
 \end{array}$$

$$\text{Average} = \frac{534}{6} = 89$$

$$\begin{array}{r}
 53 \\
 40 \\
 + 30 \\
 \hline
 123
 \end{array}
 \qquad
 \begin{array}{r}
 41 \\
 3 \overline{) 123} \\
 \underline{-12} \\
 03 \\
 \underline{-3} \\
 0
 \end{array}$$

The average temperature is 41° .

$$\begin{array}{r}
 11 \\
 23 \\
 407 \\
 92 \\
 + 7011 \\
 \hline
 7533
 \end{array}$$

$$\begin{array}{r}
 712 \\
 \times 54 \\
 \hline
 2848 \\
 35600 \\
 \hline
 38,448
 \end{array}$$

$$\begin{array}{r}
 712 \\
 - 54 \\
 \hline
 658
 \end{array}$$

$$104. \quad \frac{0}{23} = 0 \text{ because } 0 \cdot 23 = 0$$

$$\begin{array}{r}
 9 \text{ R } 25 \\
 106. \quad 31 \overline{) 304} \\
 \underline{-279} \\
 25
 \end{array}$$

108. The quotient of 200 and 20 is $200 \div 20$, which is choice b.

110. 40 divided by 8 is $40 \div 8$, which is choice c.

112. The total number of winners for the United States is 342. There are 6 categories.

$$\begin{array}{r} 57 \\ 6 \overline{) 342} \\ \underline{-30} \\ 42 \\ \underline{-42} \\ 0 \end{array}$$

The average number of Nobel Prize winners per category for the United States is 57.

114. The average will decrease; answers may vary.
116. No; answers may vary
Possible answer: The average cannot be less than each of the four numbers.
118. $84 \div 21 = 4$
The width is 4 inches.
120. answers may vary
Possible answer: 2 and 2

$$\begin{array}{r} 86 \\ -10 \\ \hline 76 \\ -10 \\ \hline 66 \\ -10 \\ \hline 56 \\ -10 \\ \hline 46 \end{array} \qquad \begin{array}{r} 46 \\ -10 \\ \hline 36 \\ -10 \\ \hline 26 \\ -10 \\ \hline 16 \\ -10 \\ \hline 6 \end{array}$$

Therefore, $86 \div 10 = 8 \text{ R } 6$.

Integrated Review

$$\begin{array}{r} 11 \\ 1. \quad 23 \\ 46 \\ + 79 \\ \hline 148 \end{array}$$

$$\begin{array}{r} 2. \quad 7006 \\ - 451 \\ \hline 6555 \end{array}$$

$$\begin{array}{r} 3. \quad 36 \\ \times 45 \\ \hline 180 \\ 1440 \\ \hline 1620 \end{array}$$

$$\begin{array}{r} 562 \\ 4. \quad 8 \overline{) 4496} \\ \underline{-40} \\ 49 \\ \underline{-48} \\ 16 \\ \underline{-16} \\ 0 \end{array}$$

5. $1 \cdot 79 = 79$

6. $\frac{36}{0}$ is undefined.

7. $9 \div 1 = 9$

8. $9 \div 9 = 1$

9. $0 \cdot 13 = 0$

10. $7 \cdot 0 \cdot 8 = 0 \cdot 8 = 0$

11. $0 \div 2 = 0$

12. $12 \div 4 = 3$

$$\begin{array}{r} 4219 \\ -1786 \\ \hline 2433 \end{array}$$

$$\begin{array}{r} 11 \\ 14. \quad 1861 \\ + 7965 \\ \hline 9826 \end{array}$$

$$\begin{array}{r} 213 \text{ R } 3 \\ 15. \quad 5 \overline{) 1068} \\ \underline{-10} \\ 06 \\ \underline{-5} \\ 18 \\ \underline{-15} \\ 3 \end{array}$$

$$\begin{array}{r} 1259 \\ 16. \quad \times 63 \\ \hline 3777 \\ 75540 \\ \hline 79,317 \end{array}$$

17. $3 \cdot 9 = 27$

18. $45 \div 5 = 9$

$$\begin{array}{r} 19. \quad 207 \\ - 69 \\ \hline 138 \end{array}$$

$$\begin{array}{r} 20. \quad 207 \\ + 69 \\ \hline 276 \end{array}$$

$$\begin{array}{r} 21. \quad 7 \overline{) 7695} \text{ R } 2 \\ \underline{-7} \\ 06 \\ \underline{-0} \\ 69 \\ \underline{-63} \\ 65 \\ \underline{-63} \\ 2 \end{array}$$

$$\begin{array}{r} 22. \quad 9 \overline{) 1000} \text{ R } 1 \\ \underline{-9} \\ 10 \\ \underline{-9} \\ 10 \\ \underline{-9} \\ 1 \end{array}$$

$$\begin{array}{r} 23. \quad 32 \overline{) 21222} \text{ R } 6 \\ \underline{-192} \\ 202 \\ \underline{-192} \\ 102 \\ \underline{-96} \\ 6 \end{array}$$

$$\begin{array}{r} 24. \quad 65 \overline{) 70000} \text{ R } 60 \\ \underline{-65} \\ 50 \\ \underline{-0} \\ 500 \\ \underline{-455} \\ 450 \\ \underline{-390} \\ 60 \end{array}$$

$$\begin{array}{r} 25. \quad 4000 \\ - 2976 \\ \hline 1024 \end{array}$$

$$\begin{array}{r} 26. \quad 10,000 \\ - 101 \\ \hline 9,899 \end{array}$$

$$\begin{array}{r} 27. \quad 303 \\ \times 101 \\ \hline 303 \\ 0 \\ 30300 \\ \hline 30,603 \end{array}$$

$$28. (475)(100) = 47,500$$

$$\begin{array}{r} 29. \quad 57 \\ + 8 \\ \hline 65 \end{array}$$

The total of 57 and 8 is 65.

$$\begin{array}{r} 30. \quad 57 \\ \times 8 \\ \hline 456 \end{array}$$

The product of 57 and 8 is 456.

$$\begin{array}{r} 31. \quad 9 \overline{) 62} \text{ R } 8 \\ \underline{-54} \\ 8 \end{array}$$

The quotient of 62 and 9 is 6 R 8.

$$\begin{array}{r} 32. \quad 62 \\ - 9 \\ \hline 53 \end{array}$$

The difference of 62 and 9 is 53.

$$\begin{array}{r} 33. \quad 200 \\ - 17 \\ \hline 183 \end{array}$$

17 subtracted from 200 is 183.

$$\begin{array}{r} 34. \quad 432 \\ - 201 \\ \hline 231 \end{array}$$

The difference of 432 and 201 is 231.

		Tens	Hundreds	Thousands
35.	9735	9740	9700	10,000
36.	1429	1430	1400	1000
37.	20,801	20,800	20,800	21,000
38.	432,198	432,200	432,200	432,000

$$\begin{array}{r}
 2 \\
 39. \quad 6 \\
 \quad 6 \\
 \quad 6 \\
 + 6 \\
 \hline
 24
 \end{array}$$

The perimeter is 24 feet.

$$\begin{aligned}
 \text{Area} &= \text{side} \times \text{side} \\
 &= 6 \text{ feet} \times 6 \text{ feet} \\
 &= 36 \text{ square feet}
 \end{aligned}$$

The area is 36 square feet.

$$\begin{array}{r}
 2 \\
 40. \quad 14 \\
 \quad 7 \\
 \quad 14 \\
 + 7 \\
 \hline
 42
 \end{array}$$

The perimeter is 42 inches.

$$\text{Area} = \text{length} \cdot \text{width} = 14 \cdot 7 = 98$$

The area is 98 square inches.

$$\begin{array}{r}
 1 \\
 41. \quad 13 \\
 \quad 9 \\
 + 6 \\
 \hline
 28
 \end{array}$$

The perimeter is 28 miles.

$$\begin{array}{r}
 2 \\
 42. \quad 3 \\
 \quad 7 \\
 \quad 6 \\
 \quad 3 \\
 \quad 3 \\
 + 4 \\
 \hline
 26
 \end{array}$$

The perimeter is 26 meters.

$$\begin{array}{r}
 3 \\
 43. \quad 19 \\
 \quad 15 \\
 \quad 25 \\
 \quad 37 \\
 + 24 \\
 \hline
 120
 \end{array}
 \qquad
 \begin{array}{r}
 24 \\
 5 \overline{) 120} \\
 \underline{-10} \\
 20 \\
 \underline{-20} \\
 0
 \end{array}$$

The average is 24.

$$\begin{array}{r}
 12 \\
 108 \\
 131 \\
 98 \\
 + 159 \\
 \hline
 496
 \end{array}
 \qquad
 \begin{array}{r}
 124 \\
 4 \overline{) 496} \\
 \underline{-4} \\
 09 \\
 \underline{-8} \\
 16 \\
 \underline{-16} \\
 0
 \end{array}$$

The average is 124.

$$\begin{array}{r}
 28,547 \\
 - 26,372 \\
 \hline
 2,175
 \end{array}$$

Lake Pontchartrain Bridge is 2175 feet longer than the Mackinac Bridge.

$$\begin{array}{r}
 365 \\
 \times 2 \\
 \hline
 730
 \end{array}$$

On average, 730 quarts of carbonated soft drinks would be consumed in a year.

Section 1.8 Practice Exercises

$$\begin{array}{ccccccc}
 \boxed{\text{Transamerica Pyramid}} & \boxed{\text{is}} & \boxed{74 \text{ feet}} & \boxed{\text{taller than}} & \boxed{555 \text{ California Street}} \\
 \downarrow & & \downarrow & & \downarrow \\
 \text{Transamerica Pyramid} & = & 74 & + & 779
 \end{array}$$

$$\begin{array}{r}
 11 \\
 74 \\
 + 779 \\
 \hline
 853
 \end{array}$$

The Transamerica Pyramid is 853 feet tall.

$$\begin{array}{ccccccc}
 \boxed{\text{Amount of money}} & \boxed{\text{is}} & \boxed{\$65,000} & \boxed{\text{divided by}} & \boxed{\text{four friends}} \\
 \downarrow & & \downarrow & & \downarrow \\
 \text{Amount of money} & = & 65,000 & \div & 4
 \end{array}$$

$$\begin{array}{r}
 16250 \\
 4 \overline{) 65000} \\
 \underline{-4} \\
 25 \\
 \underline{-24} \\
 10 \\
 \underline{-8} \\
 20 \\
 \underline{-20} \\
 00 \\
 \underline{-0} \\
 0
 \end{array}$$

Each person receives \$16,250.

3.

Total cost	is	number of blank CDs	times	cost of each CD
------------	----	---------------------	-------	-----------------

$$\begin{array}{ccccccc} \downarrow & & \downarrow & & \downarrow & & \downarrow \\ \text{Total cost} & = & 425 & & \times & & 4 \end{array}$$

$$\begin{array}{r} 425 \\ \times 4 \\ \hline 1700 \end{array}$$

The total cost for the blank CDs is \$1700.

4.

average Hawaii salary	was	average Alaska salary	less	11,168
-----------------------	-----	-----------------------	------	--------

$$\begin{array}{ccccccc} \downarrow & & \downarrow & & \downarrow & & \downarrow \\ \text{average Hawaii salary} & = & 65,468 & & - & 11,168 \\ 65,468 & & & & & & \\ - 11,168 & & & & & & \\ \hline 54,300 \end{array}$$

The average public school teacher's salary in Hawaii was \$54,300.

5. Area of the lot = length \times width = 120 feet \times 90 feet = 10,800 square feet
 Area of the house = length \times width = 65 feet \times 45 feet = 2925 square feet

Area of the lot not covered by the house	is	Area of the lot	minus	Area of the house
\downarrow	\downarrow	\downarrow	\downarrow	\downarrow
Area of the lot not covered by the house	=	10,800	–	2925
10,800				
– 2 925				
\hline 7 875				

The area of the lot not covered by the house is 7875 square feet.

Vocabulary, Readiness & Video Check 1.8

1. The George Washington Bridge has a length of 3500 feet.
2. multiplication and addition

Exercise Set 1.8

2.

What	is	12	multiplied by	9
------	----	----	---------------	---

$$\begin{array}{ccccccc} \downarrow & & \downarrow & & \downarrow & & \downarrow \\ \text{What number} & = & 12 & & \cdot & & 9 \end{array}$$

4.

78	decreased by	12	is	some number
----	--------------	----	----	-------------

$$\begin{array}{ccccccc} \downarrow & & \downarrow & & \downarrow & & \downarrow \\ 78 & & - & & 12 & = & \text{some number} \\ 78 & & & & & & \\ - 12 & & & & & & \\ \hline 66 \end{array}$$

6. The difference of 48 and 8 is some number
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 48 - 8 = some number

$$\begin{array}{r} 48 \\ - 8 \\ \hline 40 \end{array}$$

8. 60 divided by 10 is some number
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 60 \div 10 = some number

$$\begin{array}{r} 6 \\ 10 \overline{) 60} \\ \underline{-60} \\ 0 \end{array}$$

10. a. Perimeter is two times length plus two times width
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 Perimeter = 2 \cdot 100 + 2 \cdot 150
 $= 2 \cdot 100 + 2 \cdot 150$
 $= 200 + 300$
 $= 500$

The perimeter is 500 feet.

- b. Area is length times width
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 Area = 100 \times 150
 The area is 15,000 square feet.

12. Each person's share is lottery amount divided by number of persons
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 Each person's share = 147,000,000 \div 3

$$\begin{array}{r} 49000000 \\ 3 \overline{) 147000000} \end{array}$$

Each person would receive \$49 million.

14. Minutes per day is minutes per hour times hours per day
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 minutes per day = 60 \cdot 24

$$\begin{array}{r} 60 \\ \times 24 \\ \hline 240 \\ 1200 \\ \hline 1440 \end{array}$$

There are 1440 minutes in a day.

16.
- ↓ ↓ ↓ ↓ ↓
- Volume = 297,527 - 94,827

$$\begin{array}{r} 297,527 \\ - 94,827 \\ \hline 202,700 \end{array}$$

The GZ-20 held 202,700 cubic feet of helium.

18.
- ↓ ↓ ↓ ↓ ↓
- Year = 2000 - 83

$$\begin{array}{r} 2000 \\ - 83 \\ \hline 1917 \end{array}$$

Radio Flyer Wagons were first introduced in the year 1917.

20.
- ↓ ↓ ↓ ↓ ↓
- Earnings in a 52-week = 420 . 52
year

$$\begin{array}{r} 420 \\ \times 52 \\ \hline 840 \\ 21\,000 \\ \hline 21,840 \end{array}$$

A home health aide will earn \$21,840.

22.
- ↓ ↓ ↓ ↓ ↓ ↓
- Total = 260 + 260 + 280

$$\begin{array}{r} 260 \\ 260 \\ + 280 \\ \hline 800 \end{array}$$

A player must pay \$800 to the bank to purchase the yellow-colored group of properties.

24.
- ↓ ↓ ↓ ↓ ↓
- Hourly pay = 1360 ÷ 40

$$\begin{array}{r} 34 \\ 40 \overline{) 1360} \\ \underline{-120} \\ 160 \\ \underline{-160} \\ 0 \end{array}$$

The hourly pay of the loan officer is \$34.

26.
- ↓ ↓ ↓ ↓ ↓
- Calories = 3360 ÷ 12

$$\begin{array}{r} 280 \\ 12 \overline{) 3360} \\ \underline{-24} \\ 96 \\ \underline{-96} \\ 00 \\ \underline{-0} \\ 0 \end{array}$$

Each piece of cheesecake has 280 calories.

28.
- ↓ ↓ ↓ ↓ ↓
- Total number of points during the 2012 regular season = 5 . 16

$$\begin{array}{r} 16 \\ \times 5 \\ \hline 80 \end{array}$$

Adrian Peterson scored 80 points during the 2012 football season.

30.
- ↓ ↓ ↓ ↓ ↓
- Average number of associates per store = 52,000 ÷ 1300

$$\begin{array}{r}
 40 \\
 1300 \overline{) 52,000} \\
 \underline{-52\ 00} \\
 00 \\
 \underline{-0} \\
 0
 \end{array}$$

The average number of associates at each PetSmart store was 40.

32.

Number of stores outside of Texas

is

total number of stores

minus

number of stores in Texas

- ↓ ↓ ↓ ↓ ↓
- Number of stores outside of Texas = 1778 − 149

$$\begin{array}{r}
 1778 \\
 - 149 \\
 \hline
 1629
 \end{array}$$

1629 Target stores were located in states other than Texas.

34.

number of muscles to frown

is

number of muscles to smile

plus

more muscles

- ↓ ↓ ↓ ↓ ↓
- muscles = 14 + 29

$$\begin{array}{r}
 1 \\
 14 \\
 + 29 \\
 \hline
 43
 \end{array}$$

It takes 43 muscles to frown.

36.

Each payment

is

amount of loan

divided by

number of payments

- ↓ ↓ ↓ ↓ ↓
- Each payment = 6240 ÷ 48

$$\begin{array}{r}
 130 \\
 48 \overline{) 6240} \\
 \underline{-48} \\
 144 \\
 \underline{-144} \\
 00 \\
 \underline{-0} \\
 0
 \end{array}$$

Each payment is \$130.

38.

Total cost

 is

number of computers

 times

cost of computer

 plus

number of boxes of diskettes

 times

cost of box of diskettes

- ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
- Total = 10 . 2100 + 7 . 12
- $= 21,000 + 84$
 $= 21,084$
- The total cost is \$21,084.

40.

New temperature

 is

starting temperature

 minus

drop in temperature

 plus

rise in temperature

- ↓ ↓ ↓ ↓ ↓ ↓ ↓
- New temperature = 57 - 18 + 23
- $$\begin{array}{r} 57 \\ - 18 \\ \hline 39 \end{array}$$
- $$\begin{array}{r} 1 \\ 39 \\ + 23 \\ \hline 62 \end{array}$$

The new temperature is 62°F.

42. Option a: $6 \cdot \$3 + 4 \cdot \$3 + 4 \cdot \$1 = \$18 + \$12 + \$4 = \$34$

Option b: $4 \cdot \$4 + 4 \cdot \$2 + 2 \cdot \$1 + 4 \cdot \1
 $= \$16 + \$8 + \$2 + \4
 $= \$30$

The family will save \$4 by ordering (b) instead of (a).

44. Oceania/Australia had the least number of Internet users in 2012.

46. Africa had 167 million Internet users. The Middle East had 90 million users.

$$\begin{array}{r} 167 \\ - 90 \\ \hline 77 \end{array}$$

Africa had 77 million more Internet users than the Middle East.

48. Europe had 519 million Internet users. North America had 274 million users. Thus, Europe had more Internet users than North America.

$$\begin{array}{r} 519 \\ - 274 \\ \hline 245 \end{array}$$

Europe had 245 million more Internet users than North America.

50. The four fewest numbers of Internet users are 167 million, 90 million, 255 million and 24 million.

$$\begin{array}{r} 167 \\ 90 \\ 255 \\ + 24 \\ \hline 536 \end{array} \qquad \begin{array}{r} 134 \\ 4 \overline{) 536} \\ \underline{-4} \\ 13 \\ \underline{-12} \\ 16 \\ \underline{-16} \\ 0 \end{array}$$

The average number of Internet users was 134 million.

52. Total cost = $36 \cdot \$585 + 10 \cdot \388
 $= \$21,060 + \3880
 $= \$24,940$

The total cost is \$24,940.

54. The total bill = $\$1750 + \$709 + \$2168$
 $= \$4627$

The total bill for the semester is \$4627.

56. a. Area = (side)(side)
 $= (100 \text{ yards})(100 \text{ yards})$
 $= 10,000 \text{ square yards}$

- b. Area = length \cdot width
 $= 15 \cdot 25$
 $= 375 \text{ square yards}$

c.
$$\begin{array}{r} 10,000 \\ - 375 \\ \hline 9625 \end{array}$$

The area of the park that is not part of the playground is 9625 square yards.

58. 802,000,000 rounded to the nearest ten-million is 800,000,000.
 $800,000,000 \div 40,000,000 = 20$
 The revenue generated by each piece of Express Mail was about \$20.

Section 1.9 Practice Exercises

1. $8 \cdot 8 \cdot 8 \cdot 8 = 8^4$

2. $3 \cdot 3 \cdot 3 = 3^3$

3. $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 10^5$

4. $5 \cdot 5 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 = 5^2 \cdot 4^6$

5. $4^2 = 4 \cdot 4 = 16$

6. $7^3 = 7 \cdot 7 \cdot 7 = 343$

7. $11^1 = 11$

8. $2 \cdot 3^2 = 2 \cdot 3 \cdot 3 = 18$

9. $\sqrt{100} = 10$ because $10 \cdot 10 = 100$.

10. $\sqrt{4} = 2$ because $2 \cdot 2 = 4$.

11. $\sqrt{1} = 1$ because $1 \cdot 1 = 1$.

12. $9 \cdot 3 - 8 \div 4 = 27 - 8 \div 4 = 27 - 2 = 25$

13. $48 \div 3 \cdot 2^2 = 48 \div 3 \cdot 4 = 16 \cdot 4 = 64$

14. $(10 - 7)^4 + 2 \cdot 3^2 = 3^4 + 2 \cdot 3^2$
 $= 81 + 2 \cdot 9$
 $= 81 + 18$
 $= 99$

15. $36 \div [20 - (4 \cdot 2)] + 4^3 - 6 = 36 \div [20 - 8] + 4^3 - 6$
 $= 36 \div 12 + 4^3 - 6$
 $= 36 \div 12 + 64 - 6$
 $= 3 + 64 - 6$
 $= 61$

16. $\frac{25 + 8 \cdot 2 - 3^3}{2(3 - 2)} = \frac{25 + 8 \cdot 2 - 27}{2(1)}$
 $= \frac{25 + 16 - 27}{2}$
 $= \frac{14}{2}$
 $= 7$

17. $81 \div \sqrt{81} \cdot 5 + 7 = 81 \div 9 \cdot 5 + 7$
 $= 9 \cdot 5 + 7$
 $= 45 + 7$
 $= 52$

18. Area = (side)²
 $= (12 \text{ centimeters})^2$
 $= 144 \text{ square centimeters}$

The area of the square is 144 square centimeters.

Calculator Explorations

1. $4^6 = 4096$
2. $5^6 = 15,625$
3. $5^5 = 3125$
4. $7^6 = 117,649$
5. $2^{11} = 2048$
6. $6^8 = 1,679,616$
7. $7^4 + 5^3 = 2526$
8. $12^4 - 8^4 = 16,640$
9. $63 \cdot 75 - 43 \cdot 10 = 4295$
10. $8 \cdot 22 + 7 \cdot 16 = 288$
11. $4(15 \div 3 + 2) - 10 \cdot 2 = 8$
12. $155 - 2(17 + 3) + 185 = 300$

Vocabulary, Readiness & Video Check 1.9

1. In $2^5 = 32$, the 2 is called the base and the 5 is called the exponent.
2. To simplify $8 + 2 \cdot 6$, which operation should be performed first? multiplication
3. To simplify $(8 + 2) \cdot 6$, which operation should be performed first? addition
4. To simplify $9(3 - 2) \div 3 + 6$, which operation should be performed first? subtraction
5. To simplify $8 \div 2 \cdot 6$, which operation should be performed first? division
6. The square root of a whole number is one of two identical factors of the number.
7. exponent; base
8. 1
9. Because $8 \cdot 8 = 64$.
10. division, multiplication, addition

11. The area of a rectangle is length \cdot width. A square is a special rectangle where length = width. Thus, the area of a square is side \cdot side or $(\text{side})^2$.

Exercise Set 1.9

2. $5 \cdot 5 \cdot 5 \cdot 5 = 5^4$
4. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 = 6^7$
6. $10 \cdot 10 \cdot 10 = 10^3$
8. $4 \cdot 4 \cdot 3 \cdot 3 \cdot 3 = 4^2 \cdot 3^3$
10. $7 \cdot 4 \cdot 4 \cdot 4 = 7 \cdot 4^3$
12. $4 \cdot 6 \cdot 6 \cdot 6 \cdot 6 = 4 \cdot 6^4$
14. $6 \cdot 6 \cdot 2 \cdot 9 \cdot 9 \cdot 9 \cdot 9 = 6^2 \cdot 2 \cdot 9^4$
16. $6^2 = 6 \cdot 6 = 36$
18. $6^3 = 6 \cdot 6 \cdot 6 = 216$
20. $3^5 = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 243$
22. $1^{12} = 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 = 1$
24. $8^1 = 8$
26. $5^4 = 5 \cdot 5 \cdot 5 \cdot 5 = 625$
28. $3^3 = 3 \cdot 3 \cdot 3 = 27$
30. $4^3 = 4 \cdot 4 \cdot 4 = 64$
32. $8^3 = 8 \cdot 8 \cdot 8 = 512$
34. $11^2 = 11 \cdot 11 = 121$
36. $10^3 = 10 \cdot 10 \cdot 10 = 1000$
38. $14^1 = 14$
40. $4^5 = 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 = 1024$
42. $5 \cdot 3^2 = 5 \cdot 3 \cdot 3 = 45$

$$44. 2 \cdot 7^2 = 2 \cdot 7 \cdot 7 = 98$$

$$46. \sqrt{36} = 6 \text{ since } 6 \cdot 6 = 36.$$

$$48. \sqrt{121} = 11 \text{ since } 11 \cdot 11 = 121.$$

$$50. \sqrt{0} = 0 \text{ since } 0 \cdot 0 = 0.$$

$$52. \sqrt{169} = 13 \text{ since } 13 \cdot 13 = 169$$

$$54. 24 + 6 \cdot 3 = 24 + 18 = 42$$

$$56. 100 \div 10 \cdot 5 + 4 = 10 \cdot 5 + 4 = 50 + 4 = 54$$

$$58. 42 \div 7 - 6 = 6 - 6 = 0$$

$$60. 32 + \frac{8}{2} = 32 + 4 = 36$$

$$62. 3 \cdot 4 + 9 \cdot 1 = 12 + 9 = 21$$

$$64. \frac{6+9 \div 3}{3^2} = \frac{6+3}{9} = \frac{9}{9} = 1$$

$$66. 6^2 \cdot (10-8) = 6^2 \cdot 2 = 36 \cdot 2 = 72$$

$$\begin{aligned} 68. 5^3 \div (10+15) + 9^2 + 3^3 &= 5^3 \div 25 + 9^2 + 3^3 \\ &= 125 \div 25 + 81 + 27 \\ &= 5 + 81 + 27 \\ &= 113 \end{aligned}$$

$$70. \frac{40+8}{5^2-3^2} = \frac{48}{25-9} = \frac{48}{16} = 3$$

$$72. (9-7) \cdot (12+18) = 2 \cdot 30 = 60$$

$$74. \frac{5(12-7)-4}{5^2-18} = \frac{5(5)-4}{25-18} = \frac{25-4}{25-18} = \frac{21}{7} = 3$$

$$76. 18 - 7 \div 0 = \text{undefined}$$

$$\begin{aligned} 78. 2^3 \cdot 3 - (100 \div 10) &= 2^3 \cdot 3 - 10 \\ &= 8 \cdot 3 - 10 \\ &= 24 - 10 \\ &= 14 \end{aligned}$$

$$\begin{aligned} 80. [40 - (8-2)] - 2^5 &= [40-6] - 2^5 \\ &= 34 - 2^5 \\ &= 34 - 32 \\ &= 2 \end{aligned}$$

$$\begin{aligned} 82. (18 \div 6) + [(3+5) \cdot 2] &= (18 \div 6) + (8 \cdot 2) \\ &= 3 + (8 \cdot 2) \\ &= 3 + 16 \\ &= 19 \end{aligned}$$

$$\begin{aligned} 84. 35 \div [3^2 + (9-7) - 2^2] + 10 \cdot 3 \\ &= 35 \div [3^2 + 2 - 2^2] + 10 \cdot 3 \\ &= 35 \div [9 + 2 - 4] + 10 \cdot 3 \\ &= 35 \div 7 + 10 \cdot 3 \\ &= 5 + 10 \cdot 3 \\ &= 5 + 30 \\ &= 35 \end{aligned}$$

$$86. \frac{5^2 - 2^3 + 1^4}{10 \div 5 \cdot 4 \cdot 1 \div 4} = \frac{25 - 8 + 1}{2 \cdot 4 \cdot 1 \div 4} = \frac{18}{8 \div 4} = \frac{18}{2} = 9$$

$$88. 3 \cdot \sqrt{25} + 2 \cdot \sqrt{81} = 3 \cdot 5 + 2 \cdot 9 = 15 + 18 = 33$$

$$90. 7 \cdot \sqrt{36} - 0 \div \sqrt{64} = 7 \cdot 6 - 0 \div 8 = 42 - 0 = 42$$

$$\begin{aligned} 92. \frac{\sqrt{9} + 9^2}{3(10-6) - 2^2 - 1} &= \frac{3 + 81}{3(4) - 4 - 1} \\ &= \frac{84}{12 - 4 - 1} \\ &= \frac{84}{8 - 1} \\ &= \frac{84}{7} \\ &= 12 \end{aligned}$$

$$\begin{aligned} 94. \sqrt{100} \div \sqrt{4} + 3^3 \cdot 2 - 20 &= 10 \div 2 + 27 \cdot 2 - 20 \\ &= 5 + 54 - 20 \\ &= 59 - 20 \\ &= 39 \end{aligned}$$

$$\begin{aligned} 96. [\sqrt{169} \div (20-7) + 2^5] - (\sqrt{4} + \sqrt{9})^2 \\ &= [13 \div (13) + 32] - (2+3)^2 \\ &= [1 + 32] - (5)^2 \\ &= 33 - 25 \\ &= 8 \end{aligned}$$

$$\begin{aligned}
 98. \quad & 29 - \left\{ 5 + 3 \left[8 \cdot (10 - \sqrt{64}) \right] - 50 \right\} \\
 &= 29 - \{ 5 + 3[8 \cdot (10 - 8)] - 50 \} \\
 &= 29 - \{ 5 + 3[8 \cdot (2)] - 50 \} \\
 &= 29 - \{ 5 + 3[16] - 50 \} \\
 &= 29 - \{ 5 + 48 - 50 \} \\
 &= 29 - \{ 53 - 50 \} \\
 &= 29 - 3 \\
 &= 26
 \end{aligned}$$

$$\begin{aligned}
 100. \quad & \text{Area of a square} = (\text{side})^2 \\
 &= (9 \text{ centimeters})^2 \\
 &= 81 \text{ square centimeters}
 \end{aligned}$$

$$\begin{aligned}
 \text{Perimeter} &= 4(\text{side}) \\
 &= 4(9 \text{ centimeters}) \\
 &= 36 \text{ centimeters}
 \end{aligned}$$

$$\begin{aligned}
 102. \quad & \text{Area of a square} = (\text{side})^2 \\
 &= (41 \text{ feet})^2 \\
 &= 1681 \text{ square feet} \\
 \text{Perimeter} &= 4(\text{side}) = 4(41 \text{ feet}) = 164 \text{ feet}
 \end{aligned}$$

104. The statement is true.

$$\begin{aligned}
 106. \quad & 4^9 = 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \\
 & \text{The statement is false.}
 \end{aligned}$$

$$108. (2 + 3) \cdot (6 - 2) = (5) \cdot (4) = 20$$

$$\begin{aligned}
 110. \quad & 24 \div (3 \cdot 2 + 2) \cdot 5 = 24 \div (6 + 2) \cdot 5 \\
 &= 24 \div 8 \cdot 5 \\
 &= 3 \cdot 5 \\
 &= 15
 \end{aligned}$$

$$\begin{aligned}
 112. \quad & \text{The total perimeter is 1260 feet.} \\
 & 4 \times 1260 = 5040 \\
 & \text{The total charge is \$5040.}
 \end{aligned}$$

$$\begin{aligned}
 114. \quad & 25^3 \cdot (45 - 7 \cdot 5) \cdot 5 = 25^3 \cdot (45 - 35) \cdot 5 \\
 &= 25^3 \cdot (10) \cdot 5 \\
 &= 15,625 \cdot 10 \cdot 5 \\
 &= 156,250 \cdot 5 \\
 &= 781,250
 \end{aligned}$$

116. answers may vary

Chapter 1 Vocabulary Check

1. The whole numbers are 0, 1, 2, 3, ...

2. The perimeter of a polygon is its distance around or the sum of the lengths of its sides.
3. The position of each digit in a number determines its place value.
4. An exponent is a shorthand notation for repeated multiplication of the same factor.
5. To find the area of a rectangle, multiply length times width.
6. A square root of a number is one of two identical factors of the number.
7. The digits used to write numbers are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.
8. The average of a list of numbers is their sum divided by the number of numbers.
9. The 5 above is called the divisor.
10. The 35 above is called the dividend.
11. The 7 above is called the quotient.
12. The 3 above is called a factor.
13. The 6 above is called the product.
14. The 20 above is called the minuend.
15. The 9 above is called the subtrahend.
16. The 11 above is called the difference.
17. The 4 above is called an addend.
18. The 21 above is called the sum.

Chapter 1 Review

1. The place value of 4 in 7640 is tens.
2. The place value of 4 in 46,200,120 is ten-millions.
3. 7640 is written as seven thousand, six hundred forty.
4. 46,200,120 is written as forty-six million, two hundred thousand, one hundred twenty.
5. $3158 = 3000 + 100 + 50 + 8$
6. $403,225,000 = 400,000,000 + 3,000,000 + 200,000 + 20,000 + 5000$

7. Eighty-one thousand, nine hundred in standard form is 81,900.

8. Six billion, three hundred four million in standard form is 6,304,000,000.

9. Locate Europe in the first column and read across to the number in the Internet users column. There were 518,512,109 Internet users in Europe.

10. Locate North America in the first column and read across to the number in the Facebook users column. There were 184,177,220 Facebook users in North America.

11. Locate the largest number in the Facebook users column. Asia had the largest number of Facebook users.

12. Locate the smallest number in the Internet users column. Oceania/Australia had the smallest number of Internet users.

$$\begin{array}{r} 1 \\ 13. \quad 17 \\ + 46 \\ \hline 63 \end{array}$$

$$\begin{array}{r} 1 \\ 14. \quad 28 \\ + 39 \\ \hline 67 \end{array}$$

$$\begin{array}{r} 1 \\ 15. \quad 25 \\ \quad 8 \\ + 15 \\ \hline 48 \end{array}$$

$$\begin{array}{r} 1 \\ 16. \quad 27 \\ \quad 9 \\ + 41 \\ \hline 77 \end{array}$$

$$\begin{array}{r} 17. \quad 932 \\ + 24 \\ \hline 956 \end{array}$$

$$\begin{array}{r} 1 \\ 18. \quad 819 \\ + 21 \\ \hline 840 \end{array}$$

$$\begin{array}{r} 11 \\ 19. \quad 567 \\ + 7383 \\ \hline 7950 \end{array}$$

$$\begin{array}{r} 111 \\ 20. \quad 463 \\ + 6787 \\ \hline 7250 \end{array}$$

$$\begin{array}{r} 121 \\ 21. \quad 91 \\ 3623 \\ + 497 \\ \hline 4211 \end{array}$$

$$\begin{array}{r} 11 \\ 22. \quad 82 \\ 1647 \\ + 238 \\ \hline 1967 \end{array}$$

$$\begin{array}{r} 11 \\ 23. \quad 86 \\ 331 \\ + 909 \\ \hline 1326 \end{array}$$

The sum is 1326.

$$\begin{array}{r} 2 \\ 24. \quad 49 \\ 529 \\ + 308 \\ \hline 886 \end{array}$$

The sum is 886.

$$\begin{array}{r} 11 \\ 25. \quad 26,481 \\ + 865 \\ \hline 27,346 \end{array}$$

26,481 increased by 865 is 27,346.

$$\begin{array}{r} 111 \\ 26. \quad 38,556 \\ + 744 \\ \hline 39,300 \end{array}$$

38,556 increased by 744 is 39,300.

$$\begin{array}{r} 11 \\ 27. \quad 7318 \\ + 714 \\ \hline 8032 \end{array}$$

The total distance from Chicago to New Delhi if traveling by air through New York City is 8032 miles.

$$\begin{array}{r}
 1111 \\
 28. \quad 62,589 \\
 \quad 65,340 \\
 + 69,770 \\
 \hline
 197,699
 \end{array}$$

Susan Summerline's total earnings for the years 2002, 2003, and 2004 was \$197,699.

$$\begin{array}{r}
 2 \\
 29. \quad 72 \\
 \quad 72 \\
 \quad 82 \\
 + 50 \\
 \hline
 276
 \end{array}$$

The perimeter is 276 feet.

$$\begin{array}{r}
 30. \quad 20 \\
 \quad 35 \\
 + 11 \\
 \hline
 66
 \end{array}$$

The perimeter is 66 kilometers.

$$\begin{array}{r}
 31. \quad 93 \\
 - 79 \\
 \hline
 14 \\
 \text{Check:} \\
 1 \\
 14 \\
 + 79 \\
 \hline
 93
 \end{array}$$

$$\begin{array}{r}
 32. \quad 61 \\
 - 27 \\
 \hline
 34 \\
 \text{Check:} \\
 1 \\
 34 \\
 + 27 \\
 \hline
 61
 \end{array}$$

$$\begin{array}{r}
 33. \quad 462 \\
 - 397 \\
 \hline
 65 \\
 \text{Check:} \\
 11 \\
 65 \\
 + 397 \\
 \hline
 462
 \end{array}$$

$$\begin{array}{r}
 34. \quad 583 \\
 - 279 \\
 \hline
 304 \\
 \text{Check:} \\
 1 \\
 304 \\
 + 279 \\
 \hline
 583
 \end{array}$$

$$\begin{array}{r}
 35. \quad 4000 \\
 - 86 \\
 \hline
 3914 \\
 \text{Check:} \\
 3914 \\
 + 86 \\
 \hline
 4000
 \end{array}$$

$$\begin{array}{r}
 36. \quad 8000 \\
 - 92 \\
 \hline
 7908 \\
 \text{Check:} \\
 7908 \\
 + 92 \\
 \hline
 8000
 \end{array}$$

$$\begin{array}{r}
 37. \quad 25,862 \\
 - 7,965 \\
 \hline
 17,897
 \end{array}$$

$$\begin{array}{r}
 38. \quad 39,007 \\
 - 4,349 \\
 \hline
 34,658
 \end{array}$$

$$\begin{array}{r}
 39. \quad 1,382,951 \\
 - 1,144,646 \\
 \hline
 238,305
 \end{array}$$

The increase in population was 238,305 people.

$$\begin{array}{r}
 40. \quad 951,270 \\
 - 701,475 \\
 \hline
 249,795
 \end{array}$$

The decrease in population was 249,795 people.

$$\begin{array}{r}
 41. \quad 712 \\
 - 315 \\
 \hline
 397
 \end{array}$$

Bob Roma has 397 pages left to proofread.

$$\begin{array}{r}
 42. \quad 28,425 \quad 26,826 \\
 - 1,599 \quad - 1,200 \\
 \hline
 26,826 \quad 25,626
 \end{array}$$

Shelly Winter paid \$25,626 for the new car.

43. The balance was the least during the month of May.
44. The balance was the greatest during the month of August.
45.
$$\begin{array}{r} 280 \\ - 170 \\ \hline 110 \end{array}$$

The balance decreased by \$110 from February to April.
46.
$$\begin{array}{r} 490 \\ - 250 \\ \hline 240 \end{array}$$

The balance increased by \$240 from June to August.
47. To round 93 to the nearest ten, observe that the digit in the ones place is 3. Since this digit is less than 5, we do not add 1 to the digit in the tens place. The number 93 rounded to the nearest ten is 90.
48. To round 45 to the nearest ten, observe that the digit in the ones place is 5. Since this digit is at least 5, we add 1 to the digit in the tens place. The number 45 rounded to the nearest ten is 50.
49. To round 467 to the nearest ten, observe that the digit in the ones place is 7. Since this digit is at least 5, we add 1 to the digit in the tens place. The number 467 rounded to the nearest ten is 470.
50. To round 493 to the nearest hundred, observe that the digit in the tens place is 9. Since this digit is at least 5, we add 1 to the digit in the hundreds place. The number 493 rounded to the nearest hundred is 500.
51. To round 4832 to the nearest hundred, observe that the digit in the tens place is 3. Since this digit is less than 5, we do not add 1 to the digit in the hundreds place. The number 4832 rounded to the nearest hundred is 4800.
52. To round 57,534 to the nearest thousand, observe that the digit in the hundreds place is 5. Since this digit is at least 5, we add 1 to the digit in the thousands place. The number 57,534 rounded to the nearest thousand is 58,000.
53. To round 49,683,712 to the nearest million, observe that the digit in the hundred-thousands place is 6. Since this digit is at least 5, we add 1 to the digit in the millions place. $9 + 1 = 10$, so replace the digit 9 by 0 and carry 1 to the place value to the left. The number 49,683,712 rounded to the nearest million is 50,000,000.
54. To round 768,542 to the nearest hundred-thousand, observe that the digit in the ten-thousands place is 6. Since this digit is at least 5, we add 1 to the digit in the hundred-thousands place. The number 768,542 rounded to the nearest hundred-thousand is 800,000.
55. To round 126,226,713 to the nearest million, observe that the digit in the hundred-thousands place is 2. Since this digit is less than 5, we do not add 1 to the digit in the millions place. The number 126,226,713 rounded to the nearest million is 126,000,000.
56. To round 98,817 to the nearest thousand, observe that the digit in the hundreds place is 8. Since this digit is at least 5, we add 1 to the digit in the thousands place. The number 98,817 rounded to the nearest thousand is 99,000.
57.
$$\begin{array}{r} 4892 \text{ rounds to } 4900 \\ 647 \text{ rounds to } 600 \\ + 1876 \text{ rounds to } + 1900 \\ \hline \text{rounds to } 7400 \end{array}$$

The estimated sum is 7400.
58.
$$\begin{array}{r} 5925 \text{ rounds to } 5900 \\ - 1787 \text{ rounds to } - 1800 \\ \hline 4100 \end{array}$$

The estimated difference is 4100.
59.
$$\begin{array}{r} 628 \text{ rounds to } 600 \\ 290 \text{ rounds to } 300 \\ 172 \text{ rounds to } 200 \\ 58 \text{ rounds to } 100 \\ 508 \text{ rounds to } 500 \\ 445 \text{ rounds to } 400 \\ + 383 \text{ rounds to } + 400 \\ \hline 2500 \end{array}$$

The students traveled approximately 2500 miles on their week-long trip.
60.
$$\begin{array}{r} 2,160,821 \text{ rounds to } 2,200,000 \\ - 1,338,348 \text{ rounds to } - 1,300,000 \\ \hline 900,000 \end{array}$$

Houston was approximately 900,000 people larger than San Diego in 2012.

$$\begin{array}{r} 61. \quad 273 \\ \times 7 \\ \hline 1911 \end{array}$$

$$\begin{array}{r} 62. \quad 349 \\ \times 4 \\ \hline 1396 \end{array}$$

$$\begin{array}{r} 63. \quad 47 \\ \times 30 \\ \hline 0 \\ 1410 \\ \hline 1410 \end{array}$$

$$\begin{array}{r} 64. \quad 69 \\ \times 42 \\ \hline 138 \\ 2760 \\ \hline 2898 \end{array}$$

$$65. \quad 20(8)(5) = 160 \cdot 5 = 800$$

$$66. \quad 25(9)(4) = 225 \cdot (4) = 900$$

$$\begin{array}{r} 67. \quad 48 \\ \times 77 \\ \hline 336 \\ 3360 \\ \hline 3696 \end{array}$$

$$\begin{array}{r} 68. \quad 77 \\ \times 22 \\ \hline 154 \\ 1540 \\ \hline 1694 \end{array}$$

$$69. \quad 49 \cdot 49 \cdot 9 = 0$$

$$70. \quad 62 \cdot 88 \cdot 0 = 0$$

$$\begin{array}{r} 71. \quad 586 \\ \times 29 \\ \hline 5274 \\ 11720 \\ \hline 16,994 \end{array}$$

$$\begin{array}{r} 72. \quad 242 \\ \times 37 \\ \hline 1694 \\ 7260 \\ \hline 8954 \end{array}$$

$$\begin{array}{r} 73. \quad 642 \\ \times 177 \\ \hline 4494 \\ 44940 \\ 64200 \\ \hline 113,634 \end{array}$$

$$\begin{array}{r} 74. \quad 347 \\ \times 129 \\ \hline 3123 \\ 6940 \\ 34700 \\ \hline 44,763 \end{array}$$

$$\begin{array}{r} 75. \quad 1026 \\ \times 401 \\ \hline 1026 \\ 0 \\ 410400 \\ \hline 411,426 \end{array}$$

$$\begin{array}{r} 76. \quad 2107 \\ \times 302 \\ \hline 4214 \\ 0 \\ 632100 \\ \hline 636,314 \end{array}$$

$$77. \quad 375 \cdot 1000 = 375,000$$

Attach 3 zeros.

$$78. \quad 108 \cdot 1000 = 108,000$$

Attach 3 zeros.

$$\begin{array}{r} 79. \quad 30 \\ \times 4 \\ \hline 120 \end{array}$$

$$30 \cdot 400 = 30 \cdot 4 \cdot 100 = 120 \cdot 100 = 12,000$$

Attach 2 zeros.

$$\begin{array}{r} 80. \quad 50 \\ \times 7 \\ \hline 350 \end{array}$$

$$50 \cdot 700 = 50 \cdot 7 \cdot 100 = 350 \cdot 100 = 35,000$$

Attach 2 zeros.

$$\begin{array}{r} 81. \quad 17 \\ \times 3 \\ \hline 51 \end{array}$$

$$1700 \cdot 3000 = 5,100,000$$

Attach 5 zeros.

$$\begin{array}{r} 82. \quad 19 \\ \times 4 \\ \hline 76 \end{array}$$

$1900 \cdot 4000 = 7,600,000$
Attach 5 zeros.

$$\begin{array}{r} 83. \quad 230 \\ \times 5 \\ \hline 1150 \end{array}$$

The product of 5 and 230 is 1150.

$$\begin{array}{r} 84. \quad 820 \\ \times 6 \\ \hline 4920 \end{array}$$

The product of 6 and 820 is 4920.

$$\begin{array}{r} 85. \quad 12 \\ \times 9 \\ \hline 108 \end{array}$$

$$\begin{array}{r} 86. \quad 14 \\ \times 8 \\ \hline 112 \end{array}$$

$$\begin{array}{r} 87. \quad 8 \\ \times 3 \\ \hline 24 \end{array}$$

Three ounces of Swiss cheese has 24 grams of fat.

$$\begin{array}{r} 88. \quad 7617 \\ \times 20 \\ \hline 152,340 \end{array}$$

The total cost is \$152,340.

$$89. \text{ Area} = \text{length} \cdot \text{width} = 12 \times 5 = 60$$

The area is 60 square miles.

$$90. \text{ Area} = \text{length} \cdot \text{width} = 25 \times 20 = 500$$

The area is 500 square centimeters.

$$91. \quad \begin{array}{r} 3 \\ 6 \overline{) 18} \\ \underline{-18} \\ 0 \end{array}$$

$$\begin{array}{r} \text{Check: } 3 \\ \times 6 \\ \hline 18 \end{array}$$

$$92. \quad \begin{array}{r} 4 \\ 9 \overline{) 36} \\ \underline{-36} \\ 0 \end{array}$$

$$\begin{array}{r} \text{Check: } 4 \\ \times 9 \\ \hline 36 \end{array}$$

$$93. \quad \begin{array}{r} 6 \\ 7 \overline{) 42} \\ \underline{-42} \\ 0 \end{array}$$

$$\begin{array}{r} \text{Check: } 6 \\ \times 7 \\ \hline 42 \end{array}$$

$$94. \quad \begin{array}{r} 7 \\ 5 \overline{) 35} \\ \underline{-35} \\ 0 \end{array}$$

$$\begin{array}{r} \text{Check: } 7 \\ \times 5 \\ \hline 35 \end{array}$$

$$95. \quad \begin{array}{r} 5 \text{ R } 2 \\ 5 \overline{) 27} \\ \underline{-25} \\ 2 \end{array}$$

$$\text{Check: } 5 \cdot 5 + 2 = 25 + 2 = 27$$

$$96. \quad \begin{array}{r} 4 \text{ R } 2 \\ 4 \overline{) 18} \\ \underline{-16} \\ 2 \end{array}$$

$$\text{Check: } 4 \cdot 4 + 2 = 16 + 2 = 18$$

$$97. \quad 16 \div 0 \text{ is undefined.}$$

$$98. \quad 0 \div 8 = 0$$

$$99. \quad 9 \div 9 = 1$$

$$100. \quad 10 \div 1 = 10$$

$$101. \quad 0 \div 668 = 0$$

$$102. \quad 918 \div 0 \text{ is undefined.}$$

$$103. \quad \begin{array}{r} 33 \text{ R } 2 \\ 5 \overline{) 167} \\ \underline{-15} \\ 17 \\ \underline{-15} \\ 2 \end{array}$$

$$\text{Check: } 33 \cdot 5 + 2 = 165 + 2 = 167$$

$$\begin{array}{r}
 19 \text{ R } 7 \\
 8 \overline{) 159} \\
 \underline{-8} \\
 79 \\
 \underline{-72} \\
 7
 \end{array}$$

Check: $19 \cdot 8 + 7 = 152 + 7 = 159$

$$\begin{array}{r}
 24 \text{ R } 2 \\
 26 \overline{) 626} \\
 \underline{-52} \\
 106 \\
 \underline{-104} \\
 2
 \end{array}$$

Check: $24 \cdot 26 + 2 = 624 + 2 = 626$

$$\begin{array}{r}
 35 \text{ R } 15 \\
 19 \overline{) 680} \\
 \underline{-57} \\
 110 \\
 \underline{-95} \\
 15
 \end{array}$$

Check: $35 \cdot 19 + 15 = 665 + 15 = 680$

$$\begin{array}{r}
 506 \text{ R } 10 \\
 47 \overline{) 23792} \\
 \underline{-235} \\
 29 \\
 \underline{-0} \\
 292 \\
 \underline{-282} \\
 10
 \end{array}$$

Check: $506 \cdot 47 + 10 = 23,782 + 10 = 23,792$

$$\begin{array}{r}
 907 \text{ R } 40 \\
 53 \overline{) 48111} \\
 \underline{-477} \\
 41 \\
 \underline{-0} \\
 411 \\
 \underline{-371} \\
 40
 \end{array}$$

Check: $907 \cdot 53 + 40 = 48,071 + 40 = 48,111$

$$\begin{array}{r}
 2793 \text{ R } 140 \\
 207 \overline{) 578291} \\
 \underline{-414} \\
 1642 \\
 \underline{-1449} \\
 1939 \\
 \underline{-1863} \\
 761 \\
 \underline{-621} \\
 140
 \end{array}$$

Check:

$2793 \cdot 207 + 140 = 578,151 + 140 = 578,291$

$$\begin{array}{r}
 2012 \text{ R } 60 \\
 306 \overline{) 615732} \\
 \underline{-612} \\
 37 \\
 \underline{-0} \\
 373 \\
 \underline{-306} \\
 672 \\
 \underline{-612} \\
 60
 \end{array}$$

Check:

$2012 \cdot 306 + 60 = 615,672 + 60 = 615,732$

$$\begin{array}{r}
 18 \text{ R } 2 \\
 5 \overline{) 92} \\
 \underline{-5} \\
 42 \\
 \underline{-40} \\
 2
 \end{array}$$

The quotient of 92 and 5 is 18 R 2.

$$\begin{array}{r}
 21 \text{ R } 2 \\
 4 \overline{) 86} \\
 \underline{-8} \\
 06 \\
 \underline{-4} \\
 2
 \end{array}$$

The quotient of 86 and 4 is 21 R 2.

$$\begin{array}{r}
 458 \\
 12 \overline{) 5496} \\
 \underline{-48} \\
 69 \\
 \underline{-60} \\
 96 \\
 \underline{-96} \\
 0
 \end{array}$$

458 feet are in 5496 inches.

$$\begin{array}{r}
 13 \\
 114. \quad 1760 \overline{) 22880} \\
 \underline{-1760} \\
 5280 \\
 \underline{-5280} \\
 0
 \end{array}$$

13 miles are in 22,880 yards.

$$\begin{array}{r}
 22 \\
 115. \quad 76 \\
 49 \\
 32 \\
 + 47 \\
 \hline
 204
 \end{array}
 \qquad
 \begin{array}{r}
 51 \\
 4 \overline{) 204} \\
 \underline{-20} \\
 04 \\
 \underline{-4} \\
 0
 \end{array}$$

The average is 51.

$$\begin{array}{r}
 21 \\
 116. \quad 23 \\
 85 \\
 62 \\
 + 66 \\
 \hline
 236
 \end{array}
 \qquad
 \begin{array}{r}
 59 \\
 4 \overline{) 236} \\
 \underline{-20} \\
 36 \\
 \underline{-36} \\
 0
 \end{array}$$

The average is 59.

$$\begin{array}{r}
 27 \\
 117. \quad 24 \overline{) 648} \\
 \underline{-48} \\
 168 \\
 \underline{-168} \\
 0
 \end{array}$$

27 boxes can be filled with 648 cans of corn.

$$\begin{array}{r}
 32 \\
 118. \quad \times 6 \\
 \hline
 192
 \end{array}$$

The cost of 32 tickets is \$192.

$$\begin{array}{r}
 74 \\
 119. \quad - 69 \\
 \hline
 5
 \end{array}$$

U.S. companies spent \$5 billion more on advertising in 2012.

$$\begin{array}{r}
 27 \\
 120. \quad + 45 \\
 \hline
 75
 \end{array}$$

The cost to banks for a person to deposit a check with a teller is 75¢.

$$\begin{array}{r}
 32 \qquad 38 \qquad 480 \\
 121. \quad \times 15 \quad \times 11 \quad + 418 \\
 \hline
 160 \qquad 38 \qquad 898 \\
 320 \qquad 380 \\
 \hline
 480 \qquad 418
 \end{array}$$

The cost of 15 large and 11 extra-large shirts is \$898.

$$\begin{array}{r}
 110 \qquad 200 \times 80 = 16,000 \qquad 16,000 \\
 122. \quad \times 65 \qquad \qquad \qquad + 7 \, 150 \\
 \hline
 550 \qquad \qquad \qquad 23,150 \\
 6600 \\
 \hline
 7150
 \end{array}$$

The total area of the land purchased is 23,150 square feet.

$$123. \quad 7^2 = 7 \cdot 7 = 49$$

$$124. \quad 5^3 = 5 \cdot 5 \cdot 5 = 125$$

$$125. \quad 5 \cdot 3^2 = 5 \cdot 9 = 45$$

$$126. \quad 4 \cdot 10^2 = 4 \cdot 100 = 400$$

$$127. \quad 18 \div 3 + 7 = 6 + 7 = 13$$

$$128. \quad 12 - 8 \div 4 = 12 - 2 = 10$$

$$129. \quad \frac{5(6^2 - 3)}{3^2 + 2} = \frac{5(36 - 3)}{9 + 2} = \frac{5(33)}{11} = \frac{165}{11} = 15$$

$$130. \quad \frac{7(16 - 8)}{2^3} = \frac{7(8)}{8} = \frac{56}{8} = 7$$

$$131. \quad 48 \div 8 \cdot 2 = 6 \cdot 2 = 12$$

$$132. \quad 27 \div 9 \cdot 3 = 3 \cdot 3 = 9$$

$$\begin{aligned}
 133. \quad 2 + 3[1^5 + (20 - 17) \cdot 3] + 5 \cdot 2 &= 2 + 3[1 + (3) \cdot 3] + 10 \\
 &= 2 + 3[1 + 9] + 10 \\
 &= 2 + 3[10] + 10 \\
 &= 2 + 30 + 10 \\
 &= 32 + 10 \\
 &= 42
 \end{aligned}$$

$$\begin{aligned}
 134. \quad & 21 - [2^4 - (7 - 5) - 10] + 8 \cdot 2 \\
 & = 21 - [16 - (2) - 10] + 16 \\
 & = 21 - [16 - 2 - 10] + 16 \\
 & = 21 - [14 - 10] + 16 \\
 & = 21 - [4] + 16 \\
 & = 17 + 16 \\
 & = 33
 \end{aligned}$$

$$135. \quad \sqrt{81} = 9 \text{ since } 9 \cdot 9 = 81.$$

$$136. \quad \sqrt{4} = 2 \text{ since } 2 \cdot 2 = 4.$$

$$137. \quad \sqrt{1} = 1 \text{ since } 1 \cdot 1 = 1.$$

$$138. \quad \sqrt{0} = 0 \text{ since } 0 \cdot 0 = 0.$$

$$139. \quad 4 \cdot \sqrt{25} - 2 \cdot 7 = 4 \cdot 5 - 2 \cdot 7 = 20 - 14 = 6$$

$$140. \quad 8 \cdot \sqrt{49} - 3 \cdot 9 = 8 \cdot 7 - 27 = 56 - 27 = 29$$

$$\begin{aligned}
 141. \quad & (\sqrt{36} - \sqrt{16})^3 \cdot [10^2 \div (3 + 17)] \\
 & = (6 - 4)^3 \cdot [100 \div (20)] \\
 & = (2)^3 \cdot [5] \\
 & = 8 \cdot [5] \\
 & = 40
 \end{aligned}$$

$$\begin{aligned}
 142. \quad & (\sqrt{49} - \sqrt{25})^3 \cdot [9^2 \div (2 + 7)] = (7 - 5)^3 \cdot [81 \div (9)] \\
 & = (2)^3 \cdot [9] \\
 & = 8 \cdot [9] \\
 & = 72
 \end{aligned}$$

$$143. \quad \frac{5 \cdot 7 - 3 \cdot \sqrt{25}}{2(\sqrt{121} - 3^2)} = \frac{35 - 3 \cdot 5}{2(11 - 9)} = \frac{35 - 15}{2 \cdot (2)} = \frac{20}{4} = 5$$

$$144. \quad \frac{4 \cdot 8 - 1 \cdot \sqrt{121}}{3(\sqrt{81} - 2^3)} = \frac{32 - 1 \cdot 11}{3(9 - 8)} = \frac{32 - 11}{3(1)} = \frac{21}{3} = 7$$

$$145. \quad \text{Area} = (\text{side})^2 = (7 \text{ meters})^2 = 49 \text{ square meters}$$

The area is 49 square meters.

$$146. \quad \text{Area} = (\text{side})^2 = (3 \text{ inches})^2 = 9 \text{ square inches}$$

The area is 9 square inches.

$$147. \quad \begin{array}{r} 375 \\ - 68 \\ \hline 307 \end{array}$$

$$148. \quad \begin{array}{r} 729 \\ - 47 \\ \hline 682 \end{array}$$

$$149. \quad \begin{array}{r} 723 \\ \times 3 \\ \hline 2169 \end{array}$$

$$150. \quad \begin{array}{r} 629 \\ \times 4 \\ \hline 2516 \end{array}$$

$$151. \quad \begin{array}{r} 22 \\ 264 \\ 39 \\ + 598 \\ \hline 901 \end{array}$$

$$152. \quad \begin{array}{r} 21 \\ 593 \\ 52 \\ + 766 \\ \hline 1411 \end{array}$$

$$153. \quad \begin{array}{r} 458 \text{ R } 8 \\ 13 \overline{) 5962} \\ \underline{-52} \\ 76 \\ \underline{-65} \\ 112 \\ \underline{-104} \\ 8 \end{array}$$

$$154. \quad \begin{array}{r} 237 \text{ R } 1 \\ 18 \overline{) 4267} \\ \underline{-36} \\ 66 \\ \underline{-54} \\ 127 \\ \underline{-126} \\ 1 \end{array}$$

$$155. \quad \begin{array}{r} 1968 \\ \times 36 \\ \hline 11808 \\ 59040 \\ \hline 70,848 \end{array}$$

$$156. \quad \begin{array}{r} 5324 \\ \times 18 \\ \hline 42592 \\ 53240 \\ \hline 95,832 \end{array}$$

$$\begin{array}{r} 157. \quad 2000 \\ - 356 \\ \hline 1644 \end{array}$$

$$\begin{array}{r} 158. \quad 9000 \\ - 519 \\ \hline 8481 \end{array}$$

159. To round 736 to the nearest ten, observe that the digit in the ones place is 6. Since this digit is at least 5, we add 1 to the digit in the tens place. The number 736 rounded to the nearest ten is 740.

160. To round 258,371 to the nearest thousand, observe that the digit in the hundreds place is 3. Since this digit is less than 5, we do not add 1 to the digit in the thousands place. The number 258,371 rounded to the nearest thousand is 258,000.

161. To round 1999 to the nearest hundred, observe that the digit in the tens place is 9. Since this digit is at least 5, we add 1 to the digit in the hundreds place. $9 + 1 = 10$, so replace the digit 9 by 0 and carry 1 to the place value to the left. The number 1999 rounded to the nearest hundred is 2000.

162. To round 44,499 to the nearest ten-thousand, observe that the digit in the thousands place is 4. Since this digit is less than 5, we do not add 1 to the digit in the ten-thousands place. The number 44,499 rounded to the nearest ten-thousand is 40,000.

163. 36,911 written in words is thirty-six thousand nine hundred eleven.

164. 154,863 written in words is one hundred fifty-four thousand, eight hundred sixty-three.

165. Seventy thousand, nine hundred forty-three in standard form is 70,943.

166. Forty-three thousand, four hundred one in standard form is 43,401.

$$167. \quad 4^3 = 4 \cdot 4 \cdot 4 = 64$$

$$168. \quad 5^3 = 5 \cdot 5 \cdot 5 = 125$$

$$169. \quad \sqrt{144} = 12 \quad \text{since } 12 \cdot 12 = 144.$$

$$170. \quad \sqrt{100} = 10 \quad \text{since } 10 \cdot 10 = 100.$$

$$171. \quad 24 \div 4 \cdot 2 = 6 \cdot 2 = 12$$

$$172. \quad \sqrt{256} - 3 \cdot 5 = 16 - 15 = 1$$

$$173. \quad \frac{8(7-4)-10}{4^2-3^2} = \frac{8(3)-10}{16-9} = \frac{24-10}{7} = \frac{14}{7} = 2$$

$$\begin{aligned} 174. \quad \frac{(15+\sqrt{9}) \cdot (8-5)}{2^3+1} &= \frac{(15+3)(3)}{8+1} \\ &= \frac{(18)(3)}{9} \\ &= \frac{54}{9} \\ &= 6 \end{aligned}$$

$$175. \quad \begin{array}{r} 4 \\ 9 \overline{) 36} \\ - 36 \\ \hline 0 \end{array}$$

36 divided by 9 is 4.

$$176. \quad \begin{array}{r} 12 \\ \times 2 \\ \hline 24 \end{array}$$

The product of 2 and 12 is 24.

$$177. \quad \begin{array}{r} 16 \\ + 8 \\ \hline 24 \end{array}$$

16 increased by 8 is 24.

$$178. \quad \begin{array}{r} 21 \\ - 7 \\ \hline 14 \end{array}$$

7 subtracted from 21 is 14.

$$179. \quad \begin{array}{r} 7,469,000 \\ - 3,264,000 \\ \hline 4,205,000 \end{array}$$

The average salary for a Los Angeles Dodger was \$4,205,000 more in 2013 than in 2012.

$$180. \quad \begin{array}{r} 7,151,000 \\ - 5,022,000 \\ \hline 2,129,000 \end{array}$$

The average Boston Red Sox salary was \$2,129,000 less than the average New York Yankee salary in 2013.

$$\begin{array}{r}
 53 \text{ R } 18 \\
 181. \quad 32 \overline{) 1714} \\
 \underline{-160} \\
 114 \\
 \underline{-96} \\
 18
 \end{array}$$

There are 53 full boxes of drinking glasses with 18 drinking glasses left over.

$$\begin{array}{r}
 182. \quad \begin{array}{r} 27 \\ \times 2 \\ \hline 54 \end{array} \quad \begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array} \quad \begin{array}{r} 54 \\ + 32 \\ \hline 86 \end{array}
 \end{array}$$

The total bill is \$86.

Chapter 1 Test

- 82,426 is written as eighty-two thousand, four hundred twenty-six.
- Four hundred two thousand, five hundred fifty in standard form is 402,550.

$$\begin{array}{r}
 11 \\
 3. \quad 59 \\
 + 82 \\
 \hline 141
 \end{array}$$

$$\begin{array}{r}
 4. \quad 600 \\
 - 487 \\
 \hline 113
 \end{array}$$

$$\begin{array}{r}
 5. \quad 496 \\
 \times 30 \\
 \hline 0 \\
 14880 \\
 \hline 14,880
 \end{array}$$

$$\begin{array}{r}
 766 \text{ R } 42 \\
 6. \quad 69 \overline{) 52896} \\
 \underline{-483} \\
 459 \\
 \underline{-414} \\
 456 \\
 \underline{-414} \\
 42
 \end{array}$$

$$7. \quad 2^3 \cdot 5^2 = 2 \cdot 2 \cdot 2 \cdot 5 \cdot 5 = 200$$

$$8. \quad \sqrt{4} \cdot \sqrt{25} = 2 \cdot 5 = 10$$

$$9. \quad 0 \div 49 = 0$$

$$10. \quad 62 \div 0 \text{ is undefined.}$$

$$11. \quad (2^4 - 5) \cdot 3 = (16 - 5) \cdot 3 = (11) \cdot 3 = 33$$

$$\begin{aligned}
 12. \quad 16 + 9 \div 3 \cdot 4 - 7 &= 16 + 3 \cdot 4 - 7 \\
 &= 16 + 12 - 7 \\
 &= 28 - 7 \\
 &= 21
 \end{aligned}$$

$$\begin{aligned}
 13. \quad \frac{64 \div 8 \cdot 2}{(\sqrt{9} - \sqrt{4})^2 + 1} &= \frac{8 \cdot 2}{(3 - 2)^2 + 1} \\
 &= \frac{16}{1^2 + 1} \\
 &= \frac{16}{1 + 1} \\
 &= \frac{16}{2} \\
 &= 8
 \end{aligned}$$

$$\begin{aligned}
 14. \quad 2[(6 - 4)^2 + (22 - 19)^2] + 10 &= 2[(2)^2 + (3)^2] + 10 \\
 &= 2[4 + 9] + 10 \\
 &= 2[13] + 10 \\
 &= 26 + 10 \\
 &= 36
 \end{aligned}$$

$$15. \quad 5698 \cdot 1000 = 5,698,000$$

Attach 3 zeros.

$$\begin{array}{r}
 16. \quad 14 \\
 \times 8 \\
 \hline 112 \\
 8000 \cdot 1400 = 11,200,000 \\
 \text{Attach 5 zeros.}
 \end{array}$$

$$17. \quad \text{To round 52,369 to the nearest thousand, observe that the digit in the hundreds place is 3. Since this digit is less than 5, we do not add 1 to the digit in the thousands place. The number 52,369 rounded to the nearest thousand is 52,000.}$$

$$\begin{array}{r}
 18. \quad \begin{array}{r} 6289 \text{ rounds to } 6300 \\ 5403 \text{ rounds to } 5400 \\ + 1957 \text{ rounds to } + 2000 \\ \hline \text{rounds to } 13,700 \end{array}
 \end{array}$$

The estimated sum is 13,700.

$$\begin{array}{r}
 19. \quad \begin{array}{r} 4267 \text{ rounds to } 4300 \\ - 2738 \text{ rounds to } - 2700 \\ \hline \text{rounds to } 1600 \end{array}
 \end{array}$$

The estimated difference is 1600.

$$\begin{array}{r} 20. \quad 107 \\ - 15 \\ \hline 92 \end{array}$$

$$\begin{array}{r} 1 \\ 15 \\ + 107 \\ \hline 122 \end{array}$$

The sum of 15 and 107 is 122.

$$\begin{array}{r} 22. \quad 107 \\ \times 15 \\ \hline 535 \\ 1070 \\ \hline 1605 \end{array}$$

The product of 15 and 107 is 1605.

23.
$$\begin{array}{r} 7 \text{ R } 2 \\ 15 \overline{) 107} \\ \underline{-105} \\ 2 \end{array}$$

The quotient is 7 R 2.

24.
$$\begin{array}{r} 17 \\ 29 \overline{) 493} \\ \underline{-29} \\ 203 \\ \underline{-203} \\ 0 \end{array}$$

Each can of paint was \$17.

25.
$$\begin{array}{r} 725 \\ - 599 \\ \hline 126 \end{array}$$

The higher-priced refrigerator costs \$126 more than the lower-priced one.

26.
$$\begin{array}{r} 45 \\ \times 8 \\ \hline 360 \end{array}$$

Eight tablespoons of sugar contains 360 calories.

27.
$$\begin{array}{r} 430 \\ \times 16 \\ \hline 2580 \\ 4300 \\ \hline 6880 \end{array}$$

The total cost for these items is \$7905.

28.
$$\begin{array}{r} 5 \\ 5 \\ 5 \\ + 5 \\ \hline 20 \end{array}$$

The perimeter is 20 centimeters.

$$\begin{aligned}\text{Area} &= (\text{side})^2 \\ &= (5 \text{ centimeters})^2 \\ &= 25 \text{ square centimeters}\end{aligned}$$

The area is 25 square centimeters.

29. Perimeter = $2(\text{length}) + 2(\text{width})$
 $= 2(20 \text{ yards}) + 2(10 \text{ yards})$
 $= 40 \text{ yards} + 20 \text{ yards}$
 $= 60 \text{ yards}$

The perimeter is 60 yards.

$$\begin{aligned}\text{Area} &= (\text{length}) \cdot (\text{width}) \\ &= (20 \text{ yards}) \cdot (10 \text{ yards}) \\ &= 200 \text{ square yards}\end{aligned}$$

The area is 200 square yards.