

**Lesson 1-1** Write a variable expression for each phrase.
1. 6 less than \( x \) \[ x - 6 \]
2. \( y \) less than 12 \[ 12 - y \]
3. the sum of \( z \) and \( 2 \) \[ z + 2 \]
4. a number \( m \) increased by 34 \[ m + 34 \]
5. the product of \( 8 \) and \( p \) \[ 8p \]
6. \( t \) divided by 5 \[ \frac{t}{5} \]

**Lesson 1-2** Simplify each expression.
7. \( 15 + 20 \cdot 3 \) \[ 75 \]
8. \( 46 - (4 + 8) \) \[ 6 \]
9. \( 16 + 4 + 10 - 2 \) \[ 19 \]
10. \( 100 + (30 + 20) \cdot 2 \) \[ 520 \]
11. \( 5(8 + 4) + 6 + 2 \cdot 5 \) \[ 64 \]
12. \( 9 \cdot 6 - 12 = 2 \cdot 48 \)

**Lesson 1-3** Evaluate each expression.
13. \( 3x + 6 \), for \( x = 12 \) \[ 42 \]
14. \( 15x - 2a \), for \( a = 20 \) \[ 260 \]
15. \( 38 - 3y \), for \( y = 9 \) \[ 11 \]
16. \( 25 - (t + 18) \), for \( t = 7 \) \[ -1 \]
17. \( \frac{10}{y} \), for \( x = 35 \) and \( y = 65 \) \[ 0.15 \]

**Lesson 1-4** Compare. Use >, <, or = to complete each statement.
18. \( -12 \) \[ 9 \]
19. \( -\frac{4}{3} \) \[ 4 \]
20. \( -\frac{7}{2} \) \[ 7 \]
21. \( 0 \) \[ 100 \]

**Lesson 1-5 and 1-6** Write a numerical expression for each statement. Then find the sum or difference.
22. Your savings account had a balance of $175 before you deposited $250. $175 + $250 = $525
23. A hot-air balloon descends 450 ft from a height of 1,000 ft. $1,000 - 450 = 550$

**Lesson 1-7** Is each conjecture correct or incorrect? If incorrect, give a counterexample.
24. The difference of two numbers is always less than their sum. **Incorrect**
25. The sum of two numbers is always greater than zero. **Incorrect**

**Lesson 1-8** Look for a pattern to help you solve the problem.
26. You owe a friend $42. You repay the friend $2 the first day, $4 the second day, $6 the third day, and so on. How many days will you take to pay back your friend’s debt? **6 days**

**Lesson 1-9** Simplify each expression.
27. \( \frac{1}{2} (3)(4) \) \[ 6 \]
28. \( \frac{1}{2} (3)(4) \) \[ 6 \]
29. \( \frac{1}{2} (3)(4) \) \[ 6 \]
30. \( \frac{1}{2} (3)(4) \) \[ 6 \]
31. \( \frac{1}{2} (3)(4) \) \[ 6 \]
32. \( \frac{1}{2} (3)(4) \) \[ 6 \]
33. \( \frac{1}{2} (3)(4) \) \[ 6 \]
34. \( \frac{1}{2} (3)(4) \) \[ 6 \]
35. \( \frac{1}{2} (3)(4) \) \[ 6 \]
36. \( \frac{1}{2} (3)(4) \) \[ 6 \]
37. \( \frac{1}{2} (3)(4) \) \[ 6 \]
38. \( \frac{1}{2} (3)(4) \) \[ 6 \]
39. \( \frac{1}{2} (3)(4) \) \[ 6 \]
40. \( \frac{1}{2} (3)(4) \) \[ 6 \]
41. \( \frac{1}{2} (3)(4) \) \[ 6 \]
42. \( \frac{1}{2} (3)(4) \) \[ 6 \]
43. \( \frac{1}{2} (3)(4) \) \[ 6 \]
44. \( \frac{1}{2} (3)(4) \) \[ 6 \]
45. \( \frac{1}{2} (3)(4) \) \[ 6 \]
46. \( \frac{1}{2} (3)(4) \) \[ 6 \]
47. \( \frac{1}{2} (3)(4) \) \[ 6 \]
48. \( \frac{1}{2} (3)(4) \) \[ 6 \]
49. \( \frac{1}{2} (3)(4) \) \[ 6 \]
50. \( \frac{1}{2} (3)(4) \) \[ 6 \]

**Lesson 1-10** Write the coordinates of each point.
51. Three units left of the \( y \)-axis and six units below the \( x \)-axis \( (-3, -6) \)
52. Five units right of the \( y \)-axis and two units above the \( x \)-axis \( (5, 2) \)
Chapter 2  Extra Practice: Skills and Word Problems

Lesson 2-1  Simplify each expression. Justify each step. 1-6. See margin.
1. \(99 + (-46) + (-99) + 45\)  
2. \(225 + 320\)
3. \(18 + 22 + (-25) + 13\)  
4. \(5 \cdot 678 + 2\)
5. \(58 \cdot 2 + 50\)  
6. \(20 \cdot 4 + 5 \cdot 25\)

Lesson 2-2 and 2-3 Use the Distributive Property to simplify.
7. \(7(5) - 3(5)\)
8. \(3 \cdot 6 + 7 \cdot 60\)
9. \(15 \cdot 32 - 12 \cdot 32\)
10. \(7b + 25 - 4b + 3b + 25\)
11. \(3(a - 2c) - 3a - 6c\)
12. \(3y + 2(4 + 1) - 4b + 2\)
13. \(-3(4y - 1) + 5(7 - y)\)
14. \(41 - 2m + 1 - m\)
15. \(12.5 + 5x - 2(3e + 5) - x + 2\)

Lesson 2-4 Write an equation for each sentence. Is each equation true, false, or an open sentence?
16. Twice the sum of a number and one is twenty-two. \(2(x + 1) = 22\; \text{open sentence}\)
17. Negative three divided by negative one is three. \(-\frac{3}{-1} = 3\; \text{true}\)
18. Forty-five plus five equals negative fifty. \(45 + 5 = -50\; \text{false}\)

Lesson 2-5 and 2-6 Solve each equation.
19. \(40 + x = 25 - 15\)
20. \(-5 - y = 12 - 7\)
21. \(z = -23 - 47 - 24\)
22. \(14 = a - 9 - 23\)
23. \(t = 453 - 450 - 67\)
24. \(78 = b + 100 - 22\)
25. \(46 = 94 - 46\)
26. \(300 = -15 - 20\)
27. \(-12c = 180 - 15\)
28. \(\frac{3}{7} = 14 - 98\)
29. \(-4 - \frac{N}{6} = 24\)
30. \(\frac{A}{B} = -20 - 100\)

Lesson 2-8 Graph the solutions of each inequality. 31-36. See margin.
31. \(x > -12\)
32. \(y \leq 3\)
33. \(0 \geq z\)
34. \(p < -9\)
35. \(7 < n\)
36. \(f \leq -3\)

Lesson 2-9 and 2-10 Solve each inequality.
37. \(a + 3 < -1\; a < -4\)
38. \(-2 > b - 4\; 2 > b\)
39. \(5 < x < -8\; x > 12\)
40. \(-12 < -2 + y \leq 10 - y\)
41. \(w = -32 \leq 15 - w\; w = 47\)
42. \(-20 \leq z - 3 < -7\; z < 23\)
43. \(s < -3\; c = -15\)
44. \(8p < -96\; p < 12\)
45. \(0 < bx < 0 < r\)
46. \(\frac{a}{b} < -3\; t > 18\)
47. \(\frac{a}{b} > -22\; a > -240\)
48. \(-12c = -144\; k \leq 12\)

Lesson 2-11 Name each property shown.
40. Thirty-four times one is thirty-four. Identity Prop. of Mult.

Lesson 2-2 Use the Distributive Property to solve each problem.
41. A sports stadium holds 14,600 people. There are eight home games in a season. Find the total number of people who could attend home games in one season. \(116,800\) people
42. Peter drives 36 miles Monday through Friday to work and back. How many miles does she drive in one week? \(180\) mi

Lesson 2-3 Write and simplify a variable expression.
43. A family ordered four dinners at \(d\) dollars each and a \$7 side dish from a local restaurant. There is a \$3 delivery charge. \(4d + 7 + 3 = 4d + 10\)

Lesson 2-4 Write an equation to solve each problem.
44. Michelle wants to run a total of \(15\) miles per week. She runs 3 miles each day that she runs. Will she meet her goal by running \(5\) days per week? \(2d = 15, 3d = 15\) yes
45. Suppose you want to save \$105. You put \$15 per week into a savings account. Will you have \$105 in 6 weeks? \(6 \times 15 = 90\) no

Lesson 2-5 and 2-6 Write and solve an equation.
46. Jake bought five books at a yard sale. He now has 44 books. How many books did Jake have before? \(b + 5 = 44\; 39\) books
47. A painter pays \$15 per can of paint. How many cans of paint can she buy with \$165? \(15p = 165\; 11\) cans

Lesson 2-7 Use Guess, Check, and Revise to solve each problem.
48. Sam bought some tapes for \$8 each and some books for \$5 each. She paid a total of \$39. How many of each did she buy? \(5t + 8b = 39\) books, 3 tapes
49. The sum of the ages of two brothers is 22 and the product of their ages is 120. How old are the brothers? \(10\) and 12

Lesson 2-8 Write and graph an inequality for each sentence.
50. A number plus fifteen is no more than 12. \(n + 15 \leq 12\)
51. A number minus \(12\); \(f < -12\); \(p > 4\)
52. A constant times a number \(p\) is more than forty-twoc. \(2p > 42\; p > 6\)

Lesson 2-9 and 2-10 Write and solve an inequality.
53. Four times a number \(r\) is no more than sixty-five. \(4r \leq 65\; r \leq 16\)
54. You want to save at least \$100. How much do you need to save if you start with \$37? \(s = 37 \leq 100\; s = 63\) at least \$63

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Lesson 3-1  Estimate. State the method you used. 1-6. Answers may vary. Samples are given.
1. 5.35 + 7.953 about 13; rounding
2. 25.68 + 3.7 about 22; rounding
3. 6.877 + 3.521 + 8.5 about 16; front-end
4. 103.890 ≈ 25.6 about 70; rounding
5. 42.875 + 36.962 + 45.7 about 120; clustering
6. 42.651 − 12.8 about 30; rounding

Lesson 3-2  Estimate each product or quotient.
7. 7.9(12.31) about 120
8. 24.8 ÷ 5.03 about 5
9. 2.8 · 6.11 about 18
10. −5.78 ÷ 1.95 about −3
11. (−2.468)(−9.031) about 18
12. −19.32 ÷ 4.025 about −5

Lesson 3-3  Find the mean, median, and mode. When the answer is not an integer, round to the nearest tenth. Identify any outliers.
10. 13 10 13 10 12 11 12 19 14 See margin.
11. 45 86 80 85 90 90 50 88 See margin.
12. 25 $30 $28 $30 $30 $30 $30 $30 $30 mean: $27.30; median: $30; mode: $30; outlier: $15
13. 6.2 4.5 4.8 12.3 5.7 4.8 6.0 mean: 6.3; median: 5.7; mode: 4.8; outlier: 12.3

Lesson 3-4  Evaluate each formula for the given values.
17. perimeter of a rectangle: \( P = 2l + 2w \)
when \( l = 45 \) yd and \( w = 20 \) yd
18. circumference of a circle: \( C = 2\pi r \)
when \( r = 6.8 \) in. Use 3.14 for \( \pi \) about 42.7 in.
19. distance traveled: \( d = rt \)
when \( r = 50 \) mi/h and \( t = 3.5 \) h
20. perimeter of a square: \( P = 4s \)
when \( s = 12 \) cm

Lesson 3-5 and 3-6  Solve each equation.
21. \( r + 4.5 = 17.2 \)
22. \( 15.5 + y = 10.5 \)
23. \( x = 70.2 \approx 23.6 \) 83.8
24. \( 1.2b = 6 \)
25. \( c + 5.3 = 12 \)
26. \( -21.2 = p - 12.7 \)
27. \( 2.5 = 7.8 \)
28. \( 6.4 = 38.4 \)
29. \( .25 + .76 = 60.2 \)
30. \( 101.5 = 82.8 \)
31. \( 184.3 \)
32. \( 32.6 = 36.2 \)
33. \( 45.5 = 13.5 \)
34. \( 30 + 10.5 = 42 \)
35. \( 36 = 2 = 5 \)
36. \( 20 + .5 = 3.4 \)

Lesson 3-7  Complete each statement.
37. \( 0.95 \text{ m} = \text{ cm} \)
38. \( 2.5 \text{ kg} = \text{ g} \)
39. \( 60 \text{ g} = \text{ kg} \)
40. \( 56 \text{ mm} = \text{ cm} \)
41. \( 5.62 \text{ m} = \text{ cm} \)
42. \( 435 \text{ g} = \text{ kg} \)
43. \( 567 \text{ g} = \text{ kg} \)
44. \( 250 \text{ mL} = \text{ L} \)
45. \( 56 \text{ mm} = \text{ cm} \)
46. \( 234 \text{ cm} = \text{ m} \)
47. \( 567 \text{ g} = \text{ kg} \)

Lesson 3-1 and 3-2  Estimate each amount.
48. Four packages of ground beef weigh 1.94 lb, 1.82 lb, 2.21 lb, and 2.03 lb. about 8 lb
49. You buy three items that cost $4.85, $7.45, and $8.99. about $21
50. Your class is on a field trip. Thirty students buy lunches that cost $4.45 each. about $150
51. A car holds 12 gallons of gasoline. Gas costs $2.29/gal. About how much will it cost to fill the car up? about $27
52. A fund drive for a charity raised $2,450. If 120 people donated, about how much did each person donate on average? about $20

Lesson 3-3  Find the mean, median, mode, and range of each group of data. Then identify which measure of central tendency best describes the data set.
53. The daily balance in a checking account for 5 days is $30, $42, $25, $25, $34. $31; $30; $29; $17; mean
54. The heights in centimeters of ten people are 168, 160, 164, 166, 180, 178, 165, 166, 160, and 166. $167.3 \text{ cm} ; 166 \text{ cm} ; 160 \text{ cm} ; 20 \text{ cm} ; median

Lesson 3-4  Use the distance formula \( d = rt \) (where \( d \) is the distance, \( r \) is rate, or speed, and \( t \) is time spent traveling) to answer each question.
55. The length of Michelle’s commute to work is 35 mi. It takes her 54 min to get to work. What is her average speed? about 0.05 mi/min
56. Sam runs 6 mi/h. How many minutes will it take him to run 4 mi? about 40 min
57. A train travels 70 mi/h. How far does it travel in 45 min? about 25 mi

Lesson 3-5 and 3-6  Write and solve an equation.
58. Karisma spent $8.75 at a video store. She had $16.65 when she left the video store. How much money, did she start with?
59. At the deli, 1.5 lb of turkey cost $5.64. What is the cost per pound? about 3.76/lb

Lesson 3-7  Convert each unit.
60. A bag of potato chips has 400 mg of sodium per serving. How many grams of sodium does it have? about 0.4 g
61. Julius is training to run a 10-km race. How many meters long is the race? about 10,000 m

Lesson 3-8  Solve the problem by Acting It Out.
62. A class has 15 students. How many handshakes are there if each person in the class shakes hands once with everyone else? about 105 handshakes
Chapter 4

Extra Practice: Skills and Word Problems

Lesson 4-1
List all the factors of each number.
1. 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
2. 1, 2, 4, 5, 10, 20, 25, 50, 100

Lesson 4-2
Evaluate each expression.
7. \(x^2\) for \(x = 8\) 64
8. \(-2x^3\) for \(v = 2\) -16
9. \(5^2 - 4\) for \(t = 4\) 36
10. \(a^3 + 10\) for \(a = -5\) -115
11. \(mn^2\) for \(m = 3\) and \(n = 4\) 48
12. \(6(2r - 4)^2\) for \(r = 7\) 600

Lesson 4-3
Is each number prime, composite, or neither? For each composite number, write the prime factorization. Use exponents where possible. 13-18. See margin.
13. 25
14. 36
15. 47
16. 38
17. 1
18. 117

Find the GCF.
19. 20, 30 10
20. 8, 12, 18 6
21. 5x, 40x 5x
22. 6y, 108 6

Lesson 4-4
Write in simplest form.
23. \(\frac{12}{20}\)
24. \(\frac{4}{20}\)
25. \(\frac{35}{80}\) 7
26. \(\frac{12}{8}\)
27. \(\frac{9}{100}\)
28. \(\frac{16}{25}\)
29. \(\frac{7}{25}\)
30. \(\frac{5x}{65xy}\) 5
31. \(\frac{5abc}{a^2}\) 10a
32. \(\frac{6a}{16}\)
33. \(\frac{100a}{625a}\) 25

Lesson 4-5
Graph each rational number on one number line. 35-38. See margin.
35. 0.2
36. \(-\frac{3}{10}\)
37. -2
38. -1
39. -\(\frac{1}{2}\)

Lesson 4-6
Evaluate each expression for \(a = 10\) and \(b = -4\). Write in simplest form.
40. \(\frac{a + b}{a}\)
41. \(\frac{b}{a} - \frac{3}{a}\)
42. \(\frac{a - b}{3a}\)
43. \(\frac{62}{25}\)

Lesson 4-7
Simplify each expression.
44. \(3x^2 \cdot 3x^4 24x^6\)
45. \(3y^2 \cdot 7y^3 21y^5\)
46. \((p^3)^2 p^{30}\)
47. \((x^4)^2 (x^2) x^8y^2\)
48. \(\frac{x^3}{2x^2}\)
49. \(\frac{38^2}{62 - 20^2}\) 36
50. \(\frac{x^4}{y^2}\) 2
51. \(120^1\) 1

Lesson 4-8
Multiply. Express each result in scientific notation.
52. \((5 \times 10^3)(8 \times 10^5)\)
53. \((1.1 \times 10^2)(6 \times 10^{10})\)
54. \((3 \times 10^{12})(4 \times 10^5)\)

Lesson 4-9
Write the population in scientific notation.
58. The population of the United States increased by approximately 32,700,000 people between 1990 and 2000. \(3.27 \times 10^7\)

Lessons 4-1 to 4-8
Use divisibility rules to answer each question.
55. A restaurant serves a 12-piece appetizer. What sizes of groups can split the appetizer evenly? a group of 1, 2, 3, 4, 6, or 12
56. How many six-slice pizzas must you order for five people to get the same number of slices with none left over? 5 pizzas (or a multiple of 5)
57. seventeen times plus four (7x + 4)
58. A teacher divides 27 students into groups of at least two students. All the groups are the same size. What is the greatest possible number of groups? 9 groups
59. Lucia is reading a book with 25 chapters. She reads the same number of chapters each day. Can she finish the book in exactly six days? Explain. No; 6 is not a factor of 5.
60. Write a fraction in simplest form for each statement.
61. A chef used four eggs from a carton of twelve.
62. Thirty-two teams are going to play in a single-elimination tournament. How many games will be played in the tournament? 31 games
63. How many digits are used to write the numbers 90 through 110? 53 digits
64. Use the acceleration formula, \(a = \frac{v - u}{t}\) (where \(a\) is acceleration, \(v\) is final speed, \(u\) is initial speed, and \(t\) is time) to answer each question.
65. A car goes from an initial speed of 46 ft/s to a final speed of 71 ft/s in 5 s. What is the acceleration? 5 ft/s²
66. A bicyclist went from a complete stop to 18 ft/s in 6 s. What was her acceleration? 3 ft/s²
67. Write an exponential expression for each phrase. Then simplify.
68. \(x\) cubed to the fourth power
69. \(x\) four times the fourth power divided by \(y\) squared
70. Write the population in scientific notation.
71. The population of the United States increased by approximately 32,700,000 people between 1990 and 2000. \(3.27 \times 10^7\)
Lesson 5-1 Find the LCM of each group of numbers or expressions.

1. 15, 30  30
2. 4, 8, 10  40
3. 8x, 12y  24xy
4. \(3x^2, 5x^{15}\)

Compare. Use >, <, or = to complete each statement.

5. \(\frac{5}{6} \approx \frac{1}{2}\) >
6. \(\frac{1}{2} = \frac{2}{3}\) <
7. \(\frac{3}{4} \approx \frac{5}{6}\) =
8. \(\frac{1}{3} \approx -\frac{1}{4}\) >

Lesson 5-2 Write each fraction or mixed number as a decimal.

9. \(\frac{7}{8} = 0.875\)
10. \(2\frac{2}{3} = 2.6\)
11. \(\frac{3}{11} = 0.27\)
12. \(\frac{10}{3} = 3.33\)
13. \(-\frac{7}{10} = -0.7\)
14. \(-2\frac{1}{3} = -2.33\)

Write each decimal as a fraction or mixed number in simplest form.

15. 1.3 = \(\frac{13}{10}\)
16. 0.605 = \(\frac{605}{1000}\)
17. 0.6 = \(\frac{3}{5}\)
18. \(-0.15 = -\frac{3}{20}\)
19. 0.35 = \(\frac{7}{20}\)
20. 5.4 = \(\frac{54}{10}\)

Lesson 5-3 Add or subtract.

21. \(\frac{3}{4} + \frac{1}{2} = 1\)
22. \(3\frac{3}{4} = 3\frac{1}{2}\)
23. \(\frac{5}{6} + \frac{1}{4} = \frac{11}{12}\)
24. \(\frac{10}{3} - \frac{12}{5} = \frac{1}{15}\)
25. \(\frac{1}{2} + \frac{1}{2} = 1\)
26. \(\frac{3}{4} + \frac{5}{6} = \frac{12}{15}\)
27. \(\frac{7}{8} + \frac{3}{4} = \frac{19}{12}\)
28. \(\frac{5}{6} + \frac{1}{6} = \frac{6}{6}\)

Lesson 5-4 Find each product or quotient.

29. \(\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}\)
30. \(\frac{5}{6} + \frac{1}{2} = \frac{11}{12}\)
31. \(-\frac{7}{10} \times \frac{1}{2} = -\frac{7}{20}\)
32. \(\frac{5}{6} \div \frac{3}{2} = \frac{5}{6} \times \frac{2}{3} = \frac{10}{9}\)
33. \(-\frac{3}{4} \div \frac{2}{3} = -\frac{3}{4} \times \frac{3}{2} = -\frac{9}{8}\)
34. \(\frac{10}{3} \div \frac{5}{6} = \frac{10}{3} \times \frac{6}{5} = \frac{12}{5}\)
35. \(\frac{5}{6} \div \frac{1}{2} = \frac{5}{6} \times \frac{2}{1} = \frac{5}{3}\)
36. \(-\frac{5}{6} \div \frac{1}{2} = -\frac{5}{6} \times \frac{2}{1} = -\frac{5}{3}\)
37. \(\frac{7}{2} \div \frac{1}{2} = \frac{7}{2} \times \frac{2}{1} = 7\)
38. \(-\frac{9}{2} \div \frac{1}{2} = -\frac{9}{2} \times \frac{2}{1} = -9\)
39. \(-\frac{5}{2} \div \frac{1}{2} = -\frac{5}{2} \times \frac{2}{1} = -5\)

Lesson 5-5 Complete each statement.

39. 60 in. = 5 ft
40. 15 qt = 5 gal
41. 4 lb = 64 oz

Lesson 5-7 and 5-8 Solve each equation.

42. \(\frac{3}{4} + a = \frac{1}{2}\)
43. \(b - 3\frac{1}{2} = 5\)
44. \(\frac{4}{3}c = \frac{7}{10} - \frac{1}{6}\)
45. \(5d = \frac{3}{8}\)
46. \(\frac{1}{3} = f + \frac{1}{8}\)
47. \(\frac{1}{2} = g - \frac{1}{3}\)

Lesson 5-9 Simplify each expression.

48. \((8a^2)^2 = 64a^4\)
49. \((x^2y^3)^2 = x^4y^6\)
50. \((-2y^3)^2 = 4y^6\)
51. \((a^2b^3)^3 = a^6b^9\)
52. \((2y^3)^6 = 64y^{18}\)
53. \((2x^3y^2)^{\frac{1}{3}} = \left(\frac{2x^3y^2}{3}\right)^\frac{1}{3}\)
54. \((-\frac{1}{2})^3 = \frac{1}{8}\)
55. \((-\frac{1}{2})^3 = \frac{1}{8}\)
56. \((\frac{1}{2})^3 = \frac{1}{8}\)
57. \((\frac{1}{2})^3 = \frac{1}{8}\)

Lesson 5-9 Use the formula for volume of a cube, \(V = x^3\).

58. A building is made of bricks that are \(\frac{3}{4}\) ft tall. The building is 60 bricks high. Find the height of the building, \(h = \frac{860}{36}\) ft.

59. A bottle of juice is \(\frac{1}{2}\) full. How many cups of milk does he have? \(\frac{4}{c}\)

Lesson 5-6 Work backward to solve each problem.

60. Suppose you want to finish painting some windows by 4:00 pm. You will have to paint 20 min. Eating will take 25 min. You will meet with a friend for 15 min. And your travel time will be a total of 20 min. When should you start your painting? \(2:40\) pm.

61. Molly has $35. She spent $5, $6.50, and $3.20. How much money did Molly have originally? \(\$18.20\)

Lesson 5-7 and 5-8 Write and solve an equation.

62. You have read \(\frac{1}{2}\) of a book. How much of the book remains? \(b + \frac{1}{2} = 1; b = \frac{1}{2}\)

63. A building is made of bricks that are \(\frac{3}{4}\) ft tall. The building is 60 bricks high. Find the height of the building, \(h = \frac{860}{36}\) ft.

64. A formula for volume of a cube, \(V = x^3\).

70. Find the volume of a cube with side length \(5d\) cm. \(125d^3\) cm$^3$
Extra Practice: Skills and Word Problems

- **Lesson 6-1** Write each ratio as a fraction in simplest form.
  1. 15 : 30 = \(\frac{1}{2}\)
  2. 25 to 10 = \(\frac{5}{2}\)
  3. 4 out of 16 = \(\frac{1}{4}\)
  4. \(\frac{12}{35}\)

Find each unit rate.
  5. \(40 \text{ mi/h} = \frac{100}{2}\) \(\text{mi/h} = 60 \text{ ft/s}\)
  6. \(8 \text{ cm/s} = \frac{50}{1}\) \(\text{m/h} = 288 \text{ m/h}\)
  7. 5.5 \(\text{qt/min} = \frac{50}{1}\) \(\text{gal/h} = \frac{102.5}{1}\) \(\text{gal/h}\)

- **Lesson 6-2** Solve each proportion. Round to the nearest tenth where necessary.
  8. \(\frac{5}{3} = \frac{35}{21}\)
  9. \(\frac{7}{5} = \frac{85}{50}\)
  10. \(\frac{5}{2} = \frac{40}{17}\)
  11. \(\frac{45}{30} = \frac{20}{2}\)
  12. \(\frac{105}{100} = \frac{21}{21}\)
  13. \(\frac{8}{15} = \frac{26.7}{14}\)
  14. \(\frac{30}{15} = \frac{29.3}{14}\)
  15. \(\frac{5}{2} = \frac{25}{0.4}\)

- **Lesson 6-3** The scale of a map is 4 in. : 25 mi. Find the actual distance for each map distance. Round to the nearest tenth where necessary.
  16. 10 in. = 62.5 mi
  17. 5.5 in. = 43.4 mi
  18. \(\frac{1}{2}\) in. = 3.1 mi
  19. 3 in. = 18.8 mi

- **Lesson 6-4** Find each probability for one roll of a number cube. Then find the odds in favor of the event.
  20. \(P(4) = \frac{1}{2}\) to 1
  21. \(P(8) = 0\) to 6
  22. \(P(\text{even number}) = \frac{1}{2}\) to 1
  23. \(P(1\ or\ 2) = \frac{1}{3}\) to 1

- **Lesson 6-5** Write each percent as a fraction in simplest form and as a decimal.
  24. 10% = \(\frac{1}{10}\)
  25. 200% = \(\frac{2}{1}\)
  26. 6% = \(\frac{3}{50}\)
  27. 1.75% = \(\frac{7}{400}\)
  28. 8.5% = \(\frac{17}{200}\)

Write each number as a percent. Where necessary, round to the nearest tenth of a percent.
  29. 0.15 = 15%
  30. 1.2 = 120%
  31. \(\frac{1}{2}\) = 41.7%
  32. \(\frac{1}{3}\) = 12.5%
  33. 0.345 = 34.5%

- **Lessons 6-6 and 6-7** Solve each percent problem by using a proportion or an equation.
  34. Find 12% of 80. 9.6
  35. 30% of x is 12. What is x? 40
  36. What percent of 50 is 2.5% 5%

- **Lesson 6-8** Find each percent of change. Tell whether the change is an increase or a decrease.
  37. 120 to 80 = 33.3% decrease
  38. 40 to 100 = 150% increase
  39. 175 to 231 = 22% increase
  40. $4 to $3.50 = 12.5% decrease

- **Lesson 6-9** Find each sale price.
  41. regular price, $100; discount, 20% \$80
  42. regular price, $60; discount, 25% \$45

- **Lesson 6-10** Make a table to solve the problem.

- **Lesson 6-11** Find the unit rate.
  44. A person runs 40 yd in 6 s. \(\frac{2}{3}\) yd/s
  45. A car backs up 15 ft in 5 s. 3 ft/s

- **Lessons 6-2 and 6-3** Use a proportion to answer each question.
  46. An athlete measures her heart rate while exercising. Her heart beats 32 times in 15 seconds. Find her heart rate per minute. 120 beats/min
  47. A map has a scale of 1 cm : 5 km. Two cities are 4.5 cm apart on the map. What is the actual distance between the cities? 22.5 km
  48. A car is 15 ft long. A model of the car has a scale of 1 in. : 2 ft. How long is the model? 7.5 in.

- **Lesson 6-4** Find each probability.
  49. A bag contains 3 red marbles, 5 green marbles, and 2 blue marbles. You choose a marble at random. Find \(P(\text{blue})\). \(\frac{1}{4}\)
  50. Jack has 4 white shirts, 3 black shirts, and 2 blue shirts. He selects a shirt at random. Find the probability he will select a black shirt. \(\frac{3}{10}\)

- **Lesson 6-5** Write a percent to represent each situation.
  51. Thirty students of a class of 25 are absent. 12%
  52. A baseball player has a batting average of 0.275. 27.5%

- **Lesson 6-6** Write and solve a proportion.
  53. Out of 120 people who saw a movie, 40% of them enjoyed it. How many people liked the movie? 48 people

- **Lesson 6-7** Write and solve an equation.
  54. Forty-five percent of a number n is eighty. \(0.45n = 80\) \(n = 177.78\)
  55. Find the final price of a $25 item after 6% sales tax. \(p = 1.06(25)\) \$26.50

- **Lesson 6-8** Find each percent of change.
  56. Last year 150 people attended a school dance. This year 175 people attended. 16.6% increase
  57. A bicycle sold for $200 last month. The same model was on sale for $170 this month. 15% decrease

- **Lesson 6-9** Find each selling price.
  58. A $12 DVD is marked up 15%. \$13.80
  59. A $65 pair of shoes is discounted 20%. \$52

- **Lesson 6-10** Make a table to solve the problem.
  60. An investment account returns 7% each year. An investor deposits $2,500 into the account. Find the balance in the account at the end of each of the next ten years. See margin.
Chapter 7

Extra Practice: Skills and Word Problems

- Lessons 7-1, 7-2, 7-3, and 7-5 Solve and check each equation.
  1. \(10 - 5x = 15 - 1\)
  2. \(3y + 17 = 13 - 10\)
  3. \(62 = -12x + 14 - 4\)
  4. \(6x - 2x = 12\)
  5. \(x + 5 - 2x = -10\)
  6. \(24 = 2(b - 2) - 4b - 14\)
  7. \(5 - 2(x - 5) = 27 - 6\)
  8. \(-5x + 90 + 58x = 92\)
  10. \(8 - \frac{x}{2} = 53 - 90\)
  11. \(75 = \frac{24}{3} + 10\)
  12. \(\frac{3}{2}c + 18 = 24\)
  13. \(0.05x - 0.08 + x = 0.97\)
  14. \(2.5y + 3.5 = -1.5 - 2\)
  15. \(6.3p + 1.2p = 22.5\)
  16. \(2x + 6 = 3x\)
  17. \(3x + 2 = a - 8 - 5\)
  18. \(3(b - 2) = 96 - 3\)
  19. \(8(f + 3) = 10f - 32\)
  20. \(\frac{3}{4}(x - 8) = \frac{1}{2}x - 4\)

- Lesson 7-6 Solve and graph each inequality. 22-30. For graphs, see margin.
  22. \(3x + 18 > 12\)
  23. \(4 + 9a = -23\)
  24. \(10.5 < -4y + 2.5 - 2 > y\)
  25. \(19 - 3x = 5x = 7\)
  26. \(-5(a - 3) \leq 45\)
  27. \(\frac{1}{2}x - 5 \leq 4\)
  28. \(\frac{3}{4}x - 5 < 2\)
  29. \((\frac{1}{4}x + 1) = 16\)
  30. \(5.8 > 1 + 0.2m\)

- Lesson 7-7 Solve for the variable indicated in red.
  31. \(a = c + p = s = c\)
  32. \(x + y = 180\)
  33. \(a = b - c = a = c + 34\)
  37. \(l = \pi r\)

- Lesson 7-8 Find the simple interest.
  35. $450 deposited at an interest rate of 2% for 4 years $36
  36. $3,000 deposited at an interest rate of 3% for 10 years $900
  37. $10,000 deposited at an interest rate of 9% for 5 years $4,500

Find each balance.
  38. $9,000 at 6% compounded annually for 5 years $12,044.03
  40. $12,000 at 3% compounded semiannually for 8 years $15,227.83
  42. $500 at 1.5% compounded annually for 4 years $530.68

- Lessons 7-4, 7-2, 7-3, 7-4, and 7-5 Write and solve an equation.
  14. Three fourths of a number plus four is ten. \(\frac{3}{4}n + 4 = 10; 8\)
  15. Negative three times a number plus four equals twice the number minus six. \(-3n + 4 = 2n - 6; 2\)

- Darryl had $725 in his checking account. He spent $60 dollars and deposited $d$ dollars each week for 5 weeks. His final balance was $390. Find the amount of money he deposited each week. $265 - 60d + 5d = 330; \$25$

- Lila has a collection of 85 coins. She adds six coins to the collection and gives away two coins from the collection each week. Find the number of coins in her collection after 8 weeks. \(c = 85 + 8(8 - 2); 117\) coins

- Mr. Maxwell's phone service costs $40 per month plus $1.00 for each minute of long-distance calls. His bill for January was $52.20. How many long-distance minutes did he use? \(40 + 0.1m = 52.2; 122\) minutes

- Suppose you have $70 in your savings account. If you deposit $20 each week, in how many weeks will you have $250? \(70 + 20w = 250; 96\) weeks

- A car rental company charges $20 per day plus $.15 per mile. The bill for two days was $49.75. How many miles did the customer drive? \(20(2) + 0.15m = 49.75; 65\) miles

- Jane leaves school and walks home at a rate of 4 miles. 15 minutes later, Bill finds a book that Jane forgot and runs at a rate of 5 miles. How many minutes will it take Bill to catch up with Jane? \(4.2 + 0.25 = 8; 15\) minutes

- Lesson 7-6 Write and solve an inequality.
  12. A student received grades of 75, 90, and 83 on three math tests. What grade does the student need on the fourth test to have an average test score of at least 85? \(75 + 90 + 83 + x = 4 = 85; x = 92$

- Lesson 7-7 Use the distance formula \(d = rt\), where \(d\) is the distance, \(r\) is the rate, or speed, and \(t\) is time spent traveling.
  13. A car travels 35 miles in 50 minutes. What is the speed of the car in miles per hour? \(42\) mph
  14. A runner signed up for a 10-mile race. How long will it take the runner to complete the race if he runs at a rate of 8 miles per hour? \(1.25\) hours

- Lesson 7-8 Use the compound interest formula \(A = P(1 + r)^n\), where \(A\) is the final balance, \(P\) is the principal, \(r\) is the interest rate for each period, and \(n\) is the number of interest periods.
  15. Ms. Simpson takes out a $1,200 loan that charges 8% interest compounded annually. Suppose she makes no payments on the loan for 6 years. Find the balance after 6 years. $1,804.25
  16. A savings account with a balance of $150 earns 2% interest compounded semiannually. No deposits or withdrawals are made. Find the balance in the account after 5 years. $165.69

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Lesson 8-1
Is each relation a function? Explain. 1–4. See margin.
1. \([3, 4, 5, \{4, 7\}, \{4, 8\}, \{6, 10\}]\)
2. \([\{0, -1\}, \{1, 3\}, \{-2, 4\}, \{3, 6\}\)]
3. \([\{1, 5, 6\}, \{1, 1.5\}, \{2, 1.9\}, \{1, 3.2\}\)]
4. \([\{1.5, 6\}, \{0.6, \{0.6, \{0.1\}\}, \{0.2\}\}, \{0.9\}\)]

Lesson 8-2
Find the solution of each equation for \(x = -3, 0,\) and \(2\). 5–12. See margin.
5. \(y = 3x - 2\)
6. \(y = 2x + 5\)
7. \(y = \frac{1}{2}x + 8\)
8. \(y = 3 - y\)
9. \(y = -x - 4\)
10. \(2y = 6x - 10\)
11. \(x - 2y = 3\)
12. \(x + y = -1.5\)

Lesson 8-3
Find the slope and \(y\)-intercept of the graph of each equation.
13. \(y = 5x - 4\)
14. \(y = 10 - 3x\)
15. \(y = 2y + 12x\)
16. \(x + y = 16\)
17. \(y = \frac{1}{2}x - 1\)
18. \(x - y = 2\)

Graph each line. 21–28. See margin.
21. slope 3, through \((0, -5)\)
22. slope -1, through \((3, 5)\)
23. no slope, through \((2, -1)\)
24. \(y = 2x + 1\)
25. \(x + y = 4\)
26. \(y = \frac{1}{2}x - 1\)

Lesson 8-4
Write a rule for each linear function.
27. \(x\)
28. \(x\)
29. \(x\)
30. \(x\)
31. \(x\)
32. \(x\)

Lesson 8-5
Use the table to complete Exercises 33 and 34.
33. Make a scatter plot of (time studying, test grade). See margin.
34. Is there a positive correlation, negative correlation, or no correlation between the sets of data? Explain. Positive correlation; as you move to the right, most scores increase.

Lesson 8-7
Solve each system by graphing. 37–38. See back of book for graphs.
35. \(y = x + 3\)
36. \(x + y = -7\)
37. \(y > 2x - 4\)
38. \(x + y = 10\)
39. \(3x - y = 1\)
40. \(x - y = 1\)
41. \(y < -3x + 6\)
42. \(x - y < -5\)

Lesson 8-8
Write and graph a linear inequality.
43. A grocery store charges $3.50 for chicken and $5.00 for beef. How many pounds of each can you buy for less than $15? 3c + 5b < 15; See margin for graph.
Lesson 9-1 Use the figure at the right.
1. Name the line in three ways.
   \( AB, BA, AC, BC \)
2. Name four different rays.
   \( AC, BC, CA, BA \)

Use the figure at the right. Name each of the following.
3. four segments that intersect \( MR \)
   \( MB, MG, MH, ML \)
4. three segments parallel to \( MR \)
   \( NM, PN, ON \)
5. three segments skew to \( MR \)
   \( UT, NP, ST \)

Lesson 9-2 In the figure at the right, \( x \parallel y \).
6. List all angles that are congruent to \( \angle 1. \)
7. If \( m\angle 2 = 67^\circ \), what are the measures of the other angles? 
   \( m\angle 3 = 67^\circ; m\angle 4 = 67^\circ; m\angle 5 = 113^\circ; m\angle 6 = 113^\circ; m\angle 7 = 113^\circ \)

Lesson 9-3 Classify each figure.
8. isosceles right triangle
9. rectangle
10. isosceles obtuse triangle

Lesson 9-5
11. \( \triangle XYZ \cong \triangle STU \). Which of the following must be true? 
   a. \( YZ = TU \)
   b. \( \angle X = \angle T \)
   c. \( \angle Y = \angle S \)
   d. \( \angle YZ = \angle STU \)
   e. \( \angle ZXY = \angle TUS \)

Lesson 9-6 Find the circumference of each circle with the given radius or diameter. Use 3.14 for \( \pi \). Round to the nearest tenth.
12. radius = 4 in. 
   13. diameter = 25 ft 
   14. radius = 7.8 cm 
   15. diameter = 100 m 
   25.1 in. 
   78.5 ft 
   49.0 cm 
   314 m

Lesson 9-7 Draw \( \triangle XYZ \) with acute \( \angle Y \). 16-17. See margin.
16. Construct the angle bisector of \( \angle Y \).
17. Construct a bisector of \( \angle YX \).

Lesson 9-8, 9-9 and 9-10 Graph the image of \( \triangle CDG \) with vertices 
(1, 3), (3, 5), and (5, 1) after each transformation. 16-20. See margin.
18. 3 units left, 2 units down
19. reflected over the \( x \)-axis
20. rotated 90° about the origin

Lesson 9-2 Parallel lines are \( \parallel \) in the same plane. Always
21. skew lines \( \n \) intersect. Never

Lesson 9-3 Find each perimeter.
22. A pond in the shape of a regular hexagon has a side length of 3 ft. \( 18 \) ft
23. A square forms an isosceles triangle with two congruent sides
25 yd long, and the third side 10 yd long. \( 80 \) yd

Lesson 9-4 Solve by drawing a diagram.
24. Tom leaves his house and walks 3 blocks east, 6 blocks south, 2 blocks east, 4 blocks north, and 4 blocks west. How many blocks and in which direction(s) does Tom need to walk to get home?
   1 block west, 2 blocks north

Lesson 9-5 Suppose you draw a diagonal line in the sand between opposite corners in a rectangular sandbox. Does the line form two congruent triangles? Explain. Yes; the triangles are \( \equiv \) by SSS.

Lesson 9-6 Find the circumference.
26. A circular flower garden has a radius of 12 ft. \( 24 \) ft

Lesson 9-7 Construct the figure.
27. Draw \( \angle DEF \). Then construct the angle bisector \( \dot{E} \). Check students' work.

Lesson 9-8 Write the translation in arrow notation.
28. A city is moving a historic building. The building is 1.5 mi east and 2 mi south of the center of town. It is moving to a point 1 mi west and 0.4 mi south of the center of town.
   \( P1,5, -2 \rightarrow P'(-1, -0.4) \)

Lesson 9-9 Decide whether the statement is always true, sometimes true, or never true. Explain.
29. The image of a point reflected over a vertical line will have the same \( y \)-coordinate. Always; only the \( x \)-coordinate would change.

Lesson 9-10
30. Do isosceles triangles have rotational symmetry? Do equilateral triangles? Explain. Answers may vary. Sample: Equilateral triangles have 120° rotational symmetry.
   Non-equilateral, isosceles triangles do not have rotational symmetry.