Holt McDougal Larson Pre-Algebra

Practice Workbook

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1 2 3 4 5 6 7 8 9 10 XXX 20 19 18 17 16 15 14 13 12 11

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Contents

LESSON 1.1

Name _____ Date _____

Practice

For use with pages 5–9

Evaluate the expression when $y = 6$.

1. $\frac{24}{y}$ **2.** $5y$ **3.** $20 - y$ **4.** $19 + y$

5. $y + 13$ **6.** $54 - y$ **7.** $7y$ **8.** $\frac{36}{y}$

Evaluate the expression when $m = 7$, $n = 9$, and $q = 10$.

9. nq **10.** $\frac{18}{n}$ **11.** $m + q$ **12.** $29 - m$

13. $58 - m$ **14.** $41 + n$ **15.** $16q$ **16.** $\frac{36}{n}$

17. You are dividing 130 students into g equally sized groups for a field trip. Write a variable expression to find the number of students in each group.

Write a variable expression to represent the phrase.

18. A number added to 27

19. 29 decreased by a number

20. 6 fewer than a number

21. The sum of 16 and a number

22. The product of a number and 7

23. 42 divided by a number

24. The quotient of 56 and a number

25. A number multiplied by 12

In Exercises 26–29, use the following information. You belong to a book club. Your yearly book budget is $350. Each book in the book club costs $7.

26. Complete the table.

Books	Cost (dollars)	Amount left (dollars)
1	7	343
2	14	336
3	?	?
4	?	?

27. Write a variable expression for the cost of b books.

28. Write a variable expression for the amount of your budget after b books.

29. How many books will you be able to buy before the $350 is spent?

LESSON 1.2

Name _____ Date _____

Practice

For use with pages 10–13

Write the product using an exponent.

1. $43 \cdot 43 \cdot 43 \cdot 43$

2. $100 \cdot 100 \cdot 100$

3. $x \cdot x \cdot x$

4. $p \cdot p \cdot p \cdot p \cdot p$

Evaluate the expression when $n = 8$ and $n = 0.3$.

5. n^2

6. n^3

7. n^4

8. n^6

9. n^8

10. n^7

Write the power in words and as a repeated multiplication. Then evaluate the power.

11. 9^6

12. 16^4

13. 2.5^4

14. 1.4^3

Evaluate the expression when $x = 0.64$ and $y = 15$.

15. x^3

16. x^2

17. x^1

18. y^3

19. y^4

20. y^5

Find the area of the square.

21.

17 in.

22.

22 ft

23.

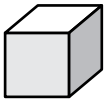
2.5 m

24.

0.6 cm

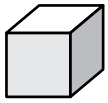
Find the volume of the cube.

25.



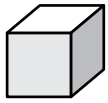
0.9 yd

26.



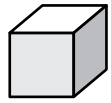
1.3 ft

27.



30 cm

28.



18 mm

29. Compare each number in the top row of the table with the number below it. Describe any pattern you see. Complete the table with a variable expression involving n.

1	2	3	4	· · ·	n
1	16	81	256	· · ·	?

LESSON 1.3

Name _____ Date _____

Practice

For use with pages 16–21

Evaluate the expression.

1. $6.1(4) + 2(1.5)$

2. $58.4 - 4(9.2)$

3. $\frac{2.6 + 3.9}{7.8 - 7.3}$

4. $\frac{42 - 17}{0.2(25)}$

5. $7(16 - 2^3)$

6. $9(3 + 5^3)$

7. $2.5[10 + (20 - 2^2)]$

8. $3.1[100 - (5^2 \cdot 3)]$

9. $90 \div [(82 - 77) \cdot 9]$

10. Find the sum of 2 cubed and 3 squared.

11. Find the difference of 10 squared and 9 squared.

Evaluate the expression when $a = 16$, $b = 8$, and $c = 7$.

12. $8c \div 4$

13. $(c + 5) \div 6$

14. $3a + 2.1(4)$

15. $\frac{2a}{15 - c}$

16. $7.2b - bc$

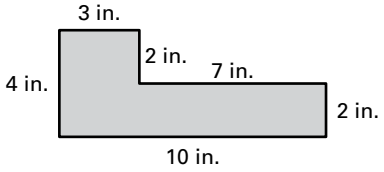
17. $b(a - 9.1)$

18. $ac[(99 - b^2) \cdot 2]$

19. $c^3[4.1(3c - 19)]$

20. $\frac{b^3(9 - 5.9)}{3.2(20.4 - 12.4)}$

21. The formula to find the area A of a rectangle is $A = \ell w$, where ℓ is the length of the rectangle and w is the width of the rectangle. The figure below can be divided into two rectangles. Find the total area of the figure.



22. You complete a project for your social studies class. There are 3 parts to the project, worth a total of 100 points. You get 50 out of 50 points on part A, and 23 out of 25 points on part C. The total score you received is 93 out of 100. How many points did you get on part B?

23. You use a long distance telephone service that charges \$.99 for the first minute of a long distance call and \$.10 for each additional minute. Write and evaluate an expression for the total cost of a 17-minute long distance phone call.

LESSON 1.4

Name _____ Date _____

Practice

For use with pages 22–26

Graph the integers on a number line. Then write the integers in order from least to greatest.

1. $-14, -11, -13, -9, -20, -7$

2. $-30, 20, 10, -15, -5, 35$

3. $0, -1, 1, -2, 2, -3, 3$

4. $40, -50, 60, 20, -30, -10$

Complete the statement using < or >.

5. $-9 \_?\_ -17$

6. $-20 \_?\_ -12$

7. $15 \_?\_ -18$

8. $0 \_?\_ -24$

9. $-32 \_?\_ 21$

10. $27 \_?\_ -14$

State the absolute value of the number.

11. -73

12. -80

13. 16

14. 106

15. -34

16. -54

State the opposite of the number.

17. -98

18. -77

19. 45

20. 70

21. 63

22. -23

Evaluate the expression when $x = -7$.

23. $|-x|$

24. $|x| + 4$

25. $2|x|$

26. $6|x|$

27. $|x| - 5$

28. $|x| + 14$

29. $-x - 3$

30. $-x + 10$

31. The table shows the daily low temperatures recorded over a seven-day period in a town.

a. Did the daily low temperature *increase* or *decrease* from Tuesday to Wednesday?

b. Did the daily low temperature *increase* or *decrease* from Thursday to Saturday?

c. Which day's low temperature was lowest? Which was highest?

Day	Temperature
Sunday	−10°C
Monday	−5°C
Tuesday	−11°C
Wednesday	−10°C
Thursday	−6°C
Friday	−7°C
Saturday	−9°C

LESSON 1.5

Name _____ Date _____

Practice

For use with pages 28–33

Tell whether the sum is positive or negative. You do not need to find the sum.

1. $-27 + (-16)$

2. $-18 + 75$

Use a number line to find the sum.

3. $-15 + (-4)$

4. $-21 + (-5)$

5. $-6 + 35$

6. $-42 + 10$

7. $11 + (-47)$

8. $9 + (-53)$

9. $-106 + (-3)$

10. $-94 + (-1)$

11. $81 + (-7)$

Find the sum.

12. $-41 + 30$

13. $-15 + 27$

14. $-21 + (-34)$

15. $-51 + (-23)$

16. $61 + (-33)$

17. $29 + (-48)$

18. $64 + (-17)$

19. $91 + (-26)$

20. $-46 + (-75)$

21. $-9 + 12 + (-4)$

22. $-22 + (-13) + 6$

23. $55 + (-26) + 47$

Evaluate the expression when $a = 8$ and $b = -14$.

24. $a + (-23)$

25. $-a + b$

26. $-72 + b$

27. $b + 39$

28. $a + (-b)$

29. $-61 + a$

30. The temperature at 6 A.M. is $-10°$ Fahrenheit. During the day, the temperature rises 6°F, drops 3°F, rises 2°F, and drops 8°F. Write an integer to represent each value. What is the temperature after these changes?

31. The table shows incomes and expenses for a small music store in one week. Write an integer to represent each value. Then find the net profit for the week.

Income		Expense	
Instruments	$800	Displays	$110
Sheet music	$100	Salaries	$400
Lessons	$150		

LESSON 1.6

Name _____ Date _____

Practice

For use with pages 34–38

Find the difference.

1. $7 - 11$

2. $15 - 26$

3. $4 - (-20)$

4. $13 - (-8)$

5. $-12 - 9$

6. $-19 - 28$

7. $-2 - (-24)$

8. $-18 - (-5)$

9. $-21 - (-6)$

Evaluate the expression when $x = -14$ and $y = -3$.

10. $x - y$

11. $29 - x$

12. $x - (-17)$

13. $-27 - y$

14. $y - 18$

15. $x - (-23)$

16. $x - 4 - 9$

17. $15 - y - 7$

18. $31 - 35 - y$

Find the change in temperature or elevation.

19. From $-16°C$ to $23°C$

20. From $-47°C$ to $-38°C$

21. From $9°F$ to $-12°F$

22. From $-16°F$ to $-27°F$

23. From -64 meters to -40 meters

24. From -20 meters to 50 meters

25. From 120 yards to -45 yards

26. From -16 feet to -32 feet

27. Find the value of the expression $-9 - (-4) - 6$.

28. Find the value of the expression $102 - (-7) - 270$.

29. A group of hikers on a mountain began at an elevation of 3040 feet above sea level and stopped at an elevation of 2319 feet above sea level. What was their change in elevation between these points? How can you tell from the change in elevation whether the hikers were going up or down the mountain?

30. The temperature at 6 A.M. was $63°F$. At 3 P.M., the temperature was $41°F$. What was the change in temperature?

FOCUS ON 1.6

Name _____ Date _____

Practice

For use with pages 39-40

Find the mean, median, mode(s), and range of the data.

1. Times (in minutes) to finish a 10-kilometer race: 63, 63, 53, 61, 55, 62, 56, 58, 60, 63
2. Costs (in dollars) of weekly grocery bills: 90, 42, 81, 26, 11, 55, 131, 108
3. Daily low temperatures (in degrees Fahrenheit): –6, 4, –3, 11, 14, 11, 7
4. Number of stories in buildings: 3, 18, 21, 5, 7, 42, 30
5. Number of times each athlete walked around a track: 5, 20, 4, 8, 21, 16, 14, 12, 13, 16
6. Ages of students in a class: 15, 15, 16, 14, 15, 15, 16, 14, 14, 15
7. Daily high temperatures (in degrees Celsius): 3, –4, –5, 0, –2, 2, –2
8. Test scores: 85, 92, 90, 78, 82, 88, 95, 76, 81, 70
9. Number of students in a class: 18, 22, 15, 27, 25, 21, 23, 24
10. Prices (in dollars) of sofas at a furniture store: 575, 685, 990, 550, 790, 825, 890
11. **Test Scores** Suppose the value 60 is included in the data set from Exercise 8. Describe the effect of this value on the mean, median, mode, and range.
12. **Class Size** Suppose each value is doubled in the data set from Exercise 9. Describe the effect this doubling has on the mean, median, mode, and range.
13. **Furniture** Suppose the sofa that costs $990 from Exercise 9 goes on sale for $890. Describe the effect of this discount on the mean, median, mode, and range.
14. **Challenge** The entrée prices at a restaurant are as follows: $21.50, $19.95, $13.50, $12.95, $15.50, $22.95, $27.95, $24.50, and $19.95. If the restaurant owner wanted to advertise the restaurant as a place to dine on a budget, what measure of central tendency do you think the owner would use to determine the average price of an entrée? *Explain*.

LESSON 1.7

Name _____ Date _____

Practice

For use with pages 41–46

Tell whether the product or quotient is *positive* or *negative*. You do not need to find the product or quotient.

1. $16(-23)$

2. $\frac{-72}{9}$

3. $-26(-17) \div 13$

Find the product or quotient.

4. $25(-5)$

5. $-29(-4)$

6. $-124 \div 31$

7. $98 \div (-14)$

8. $\frac{-102}{-17}$

9. $-32(9)$

10. $-42(-6)$

11. $201 \div (-67)$

12. $-612 \div (-18)$

13. $\frac{252}{-4}$

14. $-19(7)$

15. $-21(-11)$

Simplify.

16. $-15(16)(4)$

17. $20(-13)(-32)$

18. $-220 \div 11 \div (-4)$

19. $140 \div (-7) \div (-5)$

20. $24(-8) \div (-6)$

21. $\frac{-9(27)}{3}$

Without performing the indicated divisions, complete the statement using >, <, or =.

22. $-642 \div 214$? $-170 \div (-10)$

23. $-344 \div (-86)$? $-796 \div 199$

24. Evaluate the expression $\frac{5y}{6}$ when $y = 18$.

25. Evaluate the expression $\frac{-2m}{9}$ when $m = 27$.

26. The table shows the lowest windchill temperature for each day recorded over two weeks. Find the mean lowest windchill temperature.

Day	Windchill (in °C)	Day	Windchill (in °C)
1	−4	8	−4
2	−5	9	−6
3	−7	10	−2
4	−3	11	−4
5	−3	12	−6
6	−6	13	−10
7	−1	14	−9

LESSON 1.8

Name _____ Date _____

Practice

For use with pages 47–51

Give the coordinates of the point.

1. X

2. Y

3. Z

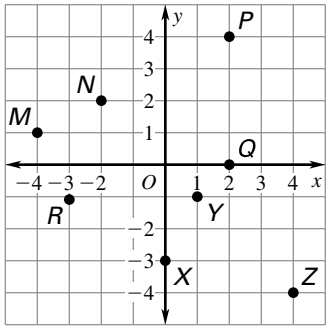
4. M

5. N

6. P

7. Q

8. R



Plot the point in a coordinate plane. Describe the location of the point.

9. $(-7, 6)$

10. $(-5, -3)$

11. $(2, 3)$

12. $(5, 2)$

13. $(-4, 0)$

14. $(3, -6)$

15. $(-2, 1)$

16. $(5, 0)$

17. $(0, -2)$

18. Use a coordinate plane.

a. Plot the points (0, 0), (0, 4), (5, 4), (8, 2), and (5, 0). Connect the points in order. Connect the last point to the first point.

b. Identify the figure. Explain your reasoning.

19. Use the variable expression $3x - 1$.

a. Evaluate the expression when $x = -3, -2, -1, 0, 1, 2$, and 3.

b. Use your results from part (a) to write a list of ordered pairs in the form $(x, 3x - 1)$.

c. Plot the ordered pairs $(x, 3x - 1)$ from part (b) in a coordinate plane.

d. Describe what you notice about the points.

20. The table shows the number of women who finished the New York City Marathon from 1997 to 2001.

Year	1997	1998	1999	2000	2001
Women Finishers	8413	8332	9160	8332	6853

a. Make a scatter plot of the data.

b. Describe any relationship you see.

LESSON 2.1

Name _____ Date _____

Practice

For use with pages 63–68

Evaluate the expression using mental math. Justify each of your steps.

1. $4(19)(-25)$ **2.** $17 + 32 + 23$ **3.** $6.8 + 9.7 + 2.2$

4. $3.06 + 5.37 + 4.94$ **5.** $10(-8)(-10)(4)$ **6.** $-15(-9)(4)(5)$

Evaluate the expression when $a = 10$, $b = -4$, and $c = -2$.

7. a^2bc^2 **8.** $23 \cdot 5c^2$ **9.** $3bc^2$

10. $a^2b \cdot 6$ **11.** $9a^2 + 9b \cdot 25$ **12.** $3b + 5a + (-6c)$

Simplify the expression.

13. $s + 7 + 96$ **14.** $-33 + j + 14$ **15.** $-21(3t)$

16. $32r(-6)$ **17.** $5.36 + p + 6.47$ **18.** $-2.05x(3.01)$

19. Identify the property illustrated by the statement $(14 \cdot 7) \cdot x = 14 \cdot (7 \cdot x)$.

20. Identify the property illustrated by the statement $18^3 + 0 = 18^3$.

Use a conversion factor to perform the indicated conversion.

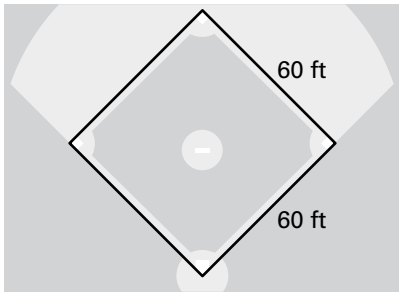
21. 27 yards to feet

22. 160 kilometers to meters

23. 540 seconds to minutes

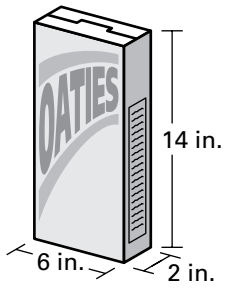
24. 112 ounces to pounds

25. The area of the infield of a college softball field is 3600 square feet. Use a conversion factor to find the area of the infield of a college softball field in square yards.



26. During the summer, you work 5 hours a day as a lifeguard at a beach and earn \$8 each hour. Use properties of multiplication to find how much money you earn during a 6-day work week.

27. The cereal box at the right is 14 inches high, 6 inches long, and 2 inches wide. The formula for the volume of a box is $V = \ell wh$. Find the volume of the box in cubic inches.



FOCUS ON **2.1**

Name _____ Date _____

Practice

For use with pages 69-70

Complete the statement. Round to the nearest whole number.

1. 7 oz ≈ __?__ g

2. 2 t ≈ __?__ kg

3. 83 fl oz ≈ __?__ mL

4. 28 cm ≈ __?__ in.

5. 90 ft ≈ __?__ m

6. 49 L ≈ __?__ gal

Complete the statement using <, >, or =.

7. 6 oz __?__ 170 g

8. $\frac{1}{2}$ t __?__ 440 kg

9. 1612 mi __?__ 2596 km

10. 17.26 in. __?__ 48.84 cm

11. 2 qt __?__ 1 L

12. 6.18 lb __?__ 2.88 kg

13. 29 fl oz __?__ 857.62 mL

14. 31 gal __?__ 115 L

15. 1.524 m __?__ 5 ft

Complete the statement. Round to the nearest whole number.

16. 9 lb ≈ __?__ g

17. 4 qt ≈ __?__ mL

18. 3 t ≈ __?__ kg

19. 17 yd ≈ __?__ m

20. 6000 mL ≈ __?__ gal

21. 50 L ≈ __?__ pt

22. Luggage A large suitcase weighs 45 pounds. What is this weight in kilograms?

23. Sprinting A track-and-field athlete sprinted 55 meters. Four minutes later, he sprinted 185 feet. Which distance is longer? *Explain* your reasoning.

24. Travel You drive 85 miles from Tampa to Orlando. What is this distance in kilometers?

25. Challenge You walk 2.5 miles on Sunday, 3 miles on Monday, 2 miles on Tuesday, 3.5 miles on Wednesday, 4 miles on Thursday, and you rest on Friday and Saturday. Your goal was to walk 28,000 meters over the course of the week. How many more meters would you have needed to walk to achieve your goal? *Explain* your reasoning.

LESSON 2.2

Name _____ Date _____

Practice

For use with pages 73–77

Use the distributive property to evaluate the expression.

1. $15(7 + 20)$ **2.** $10(6.4 + 8.9)$ **3.** $-5(24 - 17)$

4. $(4 - 16)(-8)$ **5.** $(29 - 14)(-3)$ **6.** $12(11.3 + 7.8)$

Evaluate the expression using the distributive property and mental math.

7. $312(-4)$ **8.** $487(6)$ **9.** $17.98(3)$

10. $8(1.25)$ **11.** $-7(82)$ **12.** $191(-5)$

Use the distributive property to write an equivalent variable expression.

13. $11(s + 9)$ **14.** $-21(x - 7)$ **15.** $13(20 - a)$

16. $-8(17 + b)$ **17.** $(r + 1.68)(-0.1)$ **18.** $3.25(5.02 - t)$

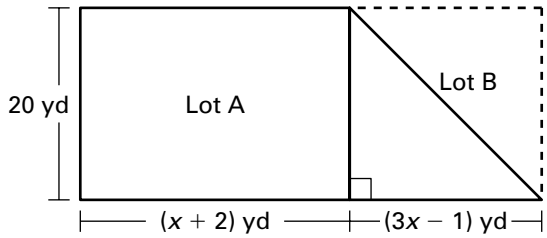
19. You and a friend go to a restaurant. You each order a salad, a cup of soup, and a drink. Each salad costs \$5.99, each cup of soup costs \$3.90, and each drink costs \$1.15. Use the distributive property to find the total cost of the meal.

20. There are several rectangular parcels of land for sale in a neighborhood. The Gonzalez family wants to purchase Lot A and half of the neighboring lot.

a. Use the distributive property to find the area, in square yards, of Lot A.

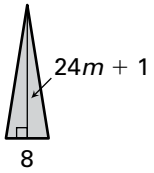
b. Use the distributive property to find the area, in square yards, of half of Lot B.

c. Find the total area of the land the Gonzalez family wishes to purchase.



Find the area of the rectangle or triangle.

21.



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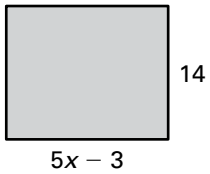

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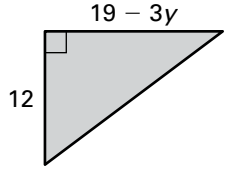


LESSON 2.3

Name _____ Date _____

Practice

For use with pages 78–83

1. Describe and correct the error in the solution.

$$\begin{aligned} 16z + 3(24z - 6) - (7 + 31z) &= 16z + 72z - 6 - 7 - 31z \\ &= 16z + 72z - 31z - 6 - 7 \\ &= 57z - 13 \end{aligned}$$

For the given expression, identify the terms, like terms, coefficients, and constant terms. Then simplify the expression.

2. $4d - 5 - 9d + 17$

3. $-8p - 12 + 7p - 11$

4. $27 - 13t + 32 - 2t + 10t$

5. $6f - 14 + 26 - 3f - 15f$

6. $-11j + 16 - 22j - 27 + 5j$

7. $-18 + 3z + 23 - 19z + 7z$

Simplify the expression.

8. $-4(5c + 7) - 3c + 13$

9. $-11(9 - 3y) + 12y - 14$

10. $2(3a - 6) - 15a - 26$

11. $-(19 - 2g^2) - 57 + 4g^2$

12. $24u - 6(8 - 4u) + 52$

13. $16x^2 - 5(7 - x^2) + 43$

14. $-(21k - 3 + 4) - 17k$

15. $8(6h - 11) + 5(20 - 3h)$

16. $10(7 - 4b) - 9(21b - 8)$

17. $-m^2 + 14 - (6m^2 + 13 + m^2)$

18. $-5w^2 + 23 - (29 - 4w^2 + 9)$

19. $28 - 6n + 7(2n - 8) - 3n$

20. $21 - 7(19 - x^2 + 6) - 3x^2 + 1$

21. You are making a rectangular poster to advertise a school fundraiser. You want the poster to be twice as long as it is wide. Let w represent the width (in meters) of the poster.

a. Write and simplify an expression in terms of w for the perimeter of the poster.

b. Write and simplify an expression in terms of w for the area of the poster.

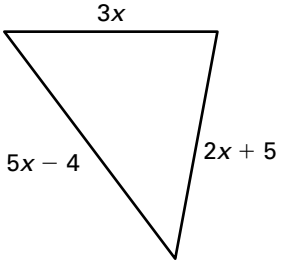
c. Complete the table.

Width (meters)	1	2	3	4
Perimeter (meters)	?	?	?	?
Area (square meters)	?	?	?	?

d. Which width given in the table allows for the most area while not exceeding a perimeter of 20 meters?

Write and simplify an expression for the perimeter of the triangle or rectangle.

22.



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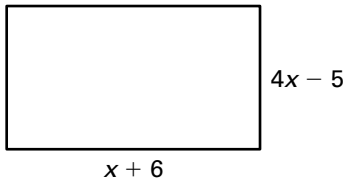

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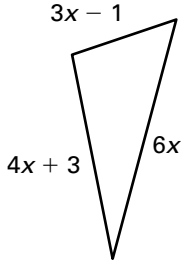


LESSON 2.4

Name _____ Date _____

Practice

For use with pages 85–89

Write the verbal sentence as an equation.

1. The difference of 11 and y is -9.

2. The sum of 41 and w is 26.

3. The quotient of r and 6 is -4.

4. The product of 18 and p is 54.

Tell whether the given value of the variable is a solution of the equation.

5. $\frac{v}{-4} = 13$; $v = -52$

6. $108 = -36z$; $z = -3$

7. $27 = n - 16$; $n = 11$

8. $84 = 78 + t$; $t = -6$

Match the equation with the corresponding question. Then solve.

9. $\frac{a}{2} = 36$

10. $2a = 36$

11. $2 + a = 36$

12. $a - 36 = 2$

A. What number minus 36 equals 2?

B. What number divided by 2 equals 36?

C. 2 times what number equals 36?

D. 2 plus what number equals 36?

Solve the equation using mental math.

13. $12b = -108$

14. $96 = -8m$

15. $49 = 7d$

16. $\frac{w}{-3} = 21$

17. $\frac{48}{h} = -16$

18. $-8 = \frac{k}{-4}$

19. $39 - f = 15$

20. $58 = 27 - \ell$

21. $z - 41 = 63$

22. $y + 43 = 58$

23. $-19 + c = 28$

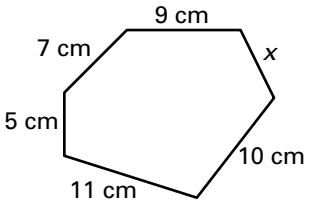
24. $g + 26 = -61$

In Exercises 25 and 26, use an equation to solve the problem.

25. While traveling a long distance, an elephant in a family walks at a rate of about 10 miles per hour. Find the approximate time it takes an elephant to travel 60 miles.

26. From 2003 to 2004, the number of students in a school declined by 140 students. In 2004, there were 530 students in the school. Find the number of students in the school in 2003.

27. The perimeter of the figure is 48 centimeters.



a. Write and simplify an equation that you can use to find x.

b. Solve your equation. What is the value of x?

LESSON 2.5

Name _____ Date _____

Practice

For use with pages 90–95

Solve the equation. Check your solution.

1. $z + 16 = 4$

2. $0 = m + 17$

3. $-3 = j + 5$

4. $h + 13 = 21$

5. $9 + g = -20$

6. $-7 + d = -26$

7. $a - 20 = -3$

8. $w - 18 = 7$

9. $t - 19 = 23$

10. $-9 = k - 11$

11. $-15 = n - 22$

12. $27 = x - 14$

13. $-8 + b = -5$

14. $t - 24 = 12$

15. $-28 + p = -3$

In Exercises 16–18, write an equation to model the situation. Then solve the equation.

16. Your friend is 3 years older than you. You are 15 years old. How old is your friend?

17. You pay $1.70 for a box of oatmeal after using a coupon for $.80 off. Find the regular price of the oatmeal.

18. There are 160 players in a soccer league. This is 23 more than last year. Find the number of players that were in the soccer league last year.

Solve the equation. Check your solution.

19. $10 + k + 6 = 22$

20. $-8 - n + 14 = 6$

21. $-9 = -15 + b - 3$

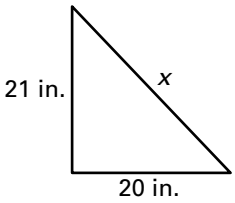
22. $y - 6 - 10 = 0$

23. $-5 - 11 - h = -7$

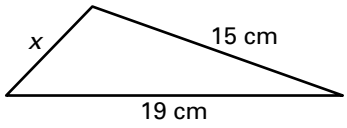
24. $18 + w - 13 = -20$

Find the value of *x* for the given triangle.

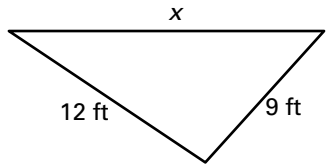
25. Perimeter = 70 in.



26. Perimeter = 41 cm



27. Perimeter = 37 ft



28. A town has its water tower filled to its capacity, 300,000 gallons. After 30 days the tower has 180,000 gallons. The tower runs out of water 44 days after that.

a. Find the change in water capacity of the water tower after the first 30 days.

b. Find the number of days it took the tower to use the 300,000 gallons of water.

LESSON 2.6

Name _____ Date _____

Practice

For use with pages 96–101

Solve the equation. Check your solution.

1. $-6y = -84$

2. $-8t = -152$

3. $418 = 19a$

4. $-136 = -17k$

5. $126 = -21p$

6. $15c = 600$

7. $\frac{d}{9} = 11$

8. $\frac{f}{8} = 20$

9. $22 = \frac{g}{-32}$

10. $-21 = \frac{r}{14}$

11. $-15 = \frac{w}{-12}$

12. $\frac{z}{-18} = 18$

13. $9m - 6m = 21$

14. $144 = -8(2x)$

15. $\frac{b}{17 + 4} = -4$

16. Sixty-four people show up for a volleyball tournament. Write and solve an equation to find how many 4-person teams can be formed.

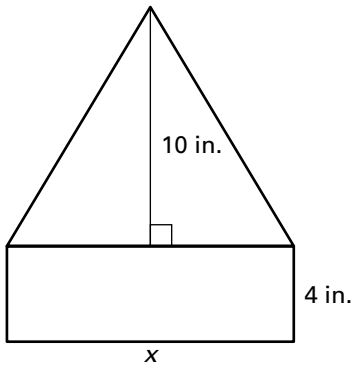
17. A high-speed rail service connects London, England, Paris, France, and Brussels, Belgium. One of the high-speed trains travels about 233 miles from London to Brussels at a speed of about 87 miles per hour. How long does the trip take?

18. A salesperson starts with a full tank of gas, drives her car 363 miles and then refuels. It takes 11 gallons of gas to fill the car's tank. How many miles per gallon did the car get?

19. The figure shown below is composed of a triangle and a rectangle.

a. Write and simplify an expression in terms of x for the area of the figure.

b. What is the value of x if the area of the figure is 108 square inches?



LESSON 2.7

Name _____ Date _____

Practice

For use with pages 102–107

Perform the indicated operation.

1. $-7.06 + 5.22$

2. $-8.17 + (-12.91)$

3. $13.07 - 20.01$

4. $-6.47 - 10.16$

5. $-15.23 - (-9.57)$

6. $-4.34 - 11.59$

7. $-16.04(-5.25)$

8. $-21.9(14.8)$

9. $18.05(-3.12)$

10. $42.125 \div (-6.74)$

11. $-96.38 \div (-12.2)$

12. $-42.822 \div 14.04$

Solve the equation. Check your solution.

13. $21.3 + r = -19.79$

14. $13.49 = -8.56 + a$

15. $-20.57 = m + 3.78$

16. $v - 17.06 = 29.08$

17. $-14.88 = d - 34.76$

18. $-31.45 = p - 12.96$

19. $30.75b = -73.8$

20. $70.448 = -25.16f$

21. $-42.12 = -7.8t$

22. $-13.25 = \frac{k}{-6}$

23. $24.36 = \frac{w}{-7.9}$

24. $\frac{c}{-20.18} = -7.35$

25. You deposit a check for $236.79 into your savings account. Your account has a balance of $319.23 after the deposit. Find the balance of your savings account before the deposit.

26. The table shows the daily low temperature in degrees Celsius for a 5-day period.

a. Find the sum of the temperatures.

b. Find the average low temperature for the 5-day period.

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Temperature (°C)	−5.24	−8.3	−9.47	−9.08	−5.13

Simplify the expression.

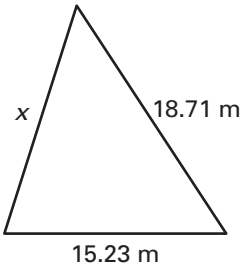
27. $-9.87x - 18.13x$

28. $27.33x - 39.42x$

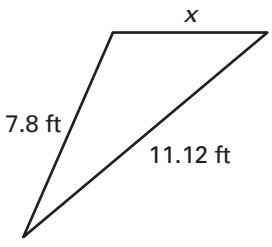
29. $-56.08x + 26.68x$

Find the value of *x* for the given triangle or rectangle.

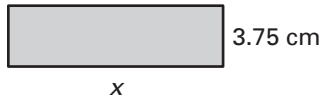
30. Perimeter = 50.35 m



31. Perimeter = 24.31 ft



32. Area = 49.65 cm^2



LESSON 3.1

Name _____ Date _____

Practice

For use with pages 119–124

Tell whether the given value of the variable is a solution of the equation.

1. $6x - 7 = 17; x = 4$

2. $1 = 4x + 9; x = -2$

3. $8 - 3x = 5; x = -1$

4. $-15 = -3x + 15; x = 5$

5. $\frac{x}{5} - 6 = -2; x = 20$

6. $-6 = \frac{x}{2} - 7; x = -2$

Solve the equation. Check your solution.

7. $7x + 12 = 26$

8. $2x + 9 = -5$

9. $-4 = 9x + 23$

10. $-10 = 6x - 16$

11. $25 - 3x = -8$

12. $4x - 15 = 25$

13. $70 = 19 - 3x$

14. $-2x - 47 = -11$

15. $-14 = -22 - \frac{x}{3}$

16. $\frac{x}{12} + 13 = 18$

17. $-10 = 8 - \frac{x}{7}$

18. $3 = \frac{x}{25} + 6$

19. $250 = 124 - 3x$

20. $-\frac{x}{9} - 12 = -23$

21. $56 - \frac{x}{15} = 47$

Write the verbal sentence as an equation. Then solve the equation.

22. Fourteen minus the product of 3 and a number is 26.

23. Negative seven minus the product of 5 and number is 28.

24. Eleven minus the quotient of a number and 8 is 15.

25. Negative sixteen plus the quotient of a number and 2 is 35.

26. Thirty-nine minus a number is -19.

27. Fifteen people volunteer for a park cleanup. The number of volunteers increases by 7 people each month for several months. After how many months will there be 50 volunteers?

28. You have a $100 gift card to spend at a store. You buy a portable compact disc player for $45. Compact discs are on sale for $11 each. How many compact discs can you buy with the money remaining on the gift card?

29. A group of 4 friends are playing golf. The total cost of the round of golf is $108. Each person in the group has the same coupon. The total cost of the round with the coupons is $76. How much is the coupon worth?

30. A school makes $715 from ticket sales for a school play. From the ticket sales, $448 is from adult tickets. Student tickets are $3 each. How many students attended the play?

31. You are rock climbing and descending a cliff at a rate of about 9 feet per minute. The cliff is about 360 feet high.

a. How long until you are at a height of 234 feet?

b. How long until you are halfway down the cliff?

LESSON 3.2

Name _____ Date _____

Practice

For use with pages 125–129

Solve the equation. Check your solution.

1. $10 + 3(x + 2) = 31$

2. $-2(x - 6) + 7 = 35$

3. $-20 - (4x - 1) = -15$

4. $12(x + 3) - 3x = 117$

5. $-25 + 4(2x + 5) = -61$

6. $187 = 19 + 7(13 - x)$

7. $20 = 14 + 3(x + 8)$

8. $-5(2x - 7) + 24 = 89$

9. $-14 = 6x - 8(x + 3)$

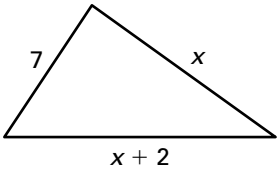
10. $-7x - (10 - x) = -58$

11. $48 = 15 + 6(4 + x) - 3x$

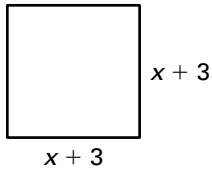
12. $23 - 7(x + 3) + 5x = 10$

Find the value of x for the given triangle, rectangle, or square.

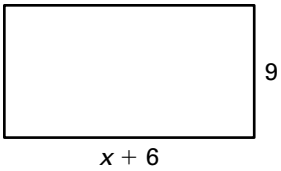
13. Perimeter = 29 units



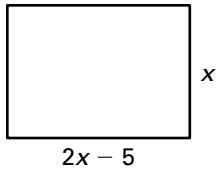
14. Perimeter = 28 units



15. Perimeter = 52 units



16. Perimeter = 38 units



17. The length of a rectangle is 3 meters more than twice its width. The perimeter of the rectangle is 48 meters. Let w represent the width.

a. Sketch a diagram of the rectangle.

b. Write an equation for the perimeter of the rectangle.

c. Find the length and width of the rectangle.

18. A class of 42 students and 2 teachers plan a trip to an observatory. The class has raised $485 for the trip. Admission is $5 per person and bus rental is $230. With the remaining money, the class can invite guests to fill the remaining seats on the bus. Write and solve an equation to find the number of guests g the class can invite.

19. A plumber charges $30 per hour and $42 for each hour of overtime. For a job, the plumber works 3 regular hours, h overtime hours, and charges $195 for new parts. The total amount of the bill for the job is $390. Write and solve an equation to find the number of overtime hours the plumber worked.

FOCUS ON **3.2**

Name _____ Date _____

Practice

For use with pages 129A–129B

1. Savings You have $1400 in your savings account. You want to increase your savings to $5000. You plan to save $40 per week until you reach your goal. How long will it take you to reach your goal?

a. Solve the problem arithmetically. List the steps you used.

b. Solve the problem algebraically. List the steps you used.

c. Are the operations used in parts (a) and (b) performed in the same order? Explain.

2. Perimeter The perimeter of a triangle is 112 meters. Two of the side lengths are 56 meters and 31 meters. What is the length of the third side?

a. Solve the problem arithmetically. List the steps you used.

b. Solve the problem algebraically. List the steps you used.

c. Are the operations used in parts (a) and (b) performed in the same order? Explain.

3. Shopping You buy a computer for $642. You make a down payment of half the cost and pay off the rest in three monthly payments. How much is each monthly payment?

a. Solve the problem arithmetically. List the steps you used.

b. Solve the problem algebraically. List the steps you used.

c. Are the operations used in parts (a) and (b) performed in the same order? Explain.

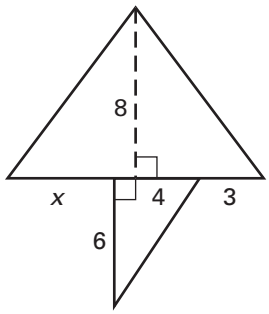
4. Party You are hosting a birthday party. You buy a cake that costs $35 and decorations that cost $24. You want to have noisemakers and party hats to give to each guest. Each noisemaker costs $.75 and each party hat costs $1.30. If you only have $100 to spend on the party, how many guests can be invited?

a. Solve the problem arithmetically. List the steps you used.

b. Solve the problem algebraically. List the steps you used.

c. Are the operations used in parts (a) and (b) performed in the same order? Explain.

5. Challenge The figure is composed of two triangles. The figure has a total area of 60 square units. Find the value of x.



a. Solve the problem arithmetically. List the steps you used.

b. Solve the problem algebraically. List the steps you used.

c. Are the operations used in parts (a) and (b) performed in the same order? Explain.

LESSON 3.3

Name _____ Date _____

Practice

For use with pages 130–136

Tell whether the given value of the variable is a solution of the equation.

1. $41 - 8x = -6x - 23; x = -9$

2. $4x + 13 = -9 - 3(x + 9); x = -7$

3. $-2(3x + 7) = -3(2x + 8); x = -5$

4. $-9x + 7 = 25 + 2(5 - x); x = -4$

Solve the equation. Check your solution.

5. $12x - 28 = -63 + 7x$

6. $6x - 21 = 33 + 9x$

7. $-15x = -5(3x + 7)$

8. $16x - 19 = 113 - 6x$

9. $-19x - 34 = 56 - x$

10. $-6(4x + 3) = 6(-4x - 3)$

11. $3(-2x + 5) = 11 - 4x$

12. $14 - 9x = -8(10 + x)$

13. $-3(8x + 11) = 6(-4x - 13)$

14. $5x - 8 = 13 + 7(x - 3)$

15. $15x + 24 = 8(10 + 3x) - 2$

16. $-9x + 15 = -22 - 4(x + 12)$

Write the verbal sentence as an equation. Then solve the equation.

17. Negative thirteen times a number plus 20 is equal to -11 times the number plus 38.

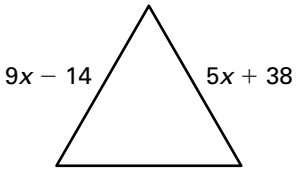
18. Seventeen less than 6 times a number is equal to 47 plus 10 times the number.

19. Twenty nine less than -10 times a number is equal to -18 times the number plus 91.

20. Seventeen times a number minus 56 is equal to 10 times the number minus 63.

Find the perimeter of the triangle or rectangle. The sides of the triangle are equal in length.

21.



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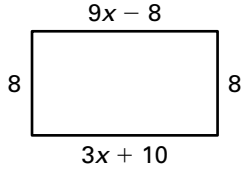


23. You are buying flowers to hand out at a school dance. Roses cost $30 for a dozen but cost more if bought individually. With the money you have, you can buy 7 dozen and 4 single roses, or 64 single roses. How much is one rose? How much money do you have?

24. The populations of two towns are changing at steady rates. One town has a population of 25,500. Its population is increasing by 2000 people each year. The other town has a population of 47,900. Its population is decreasing by 800 people each year. If the rates for each town remain the same, in how many years will the populations be the same?

FOCUS ON **3.3**

Name _____ Date _____

Practice

For use with pages 138–139

Solve the literal equation for *x*. Then use the equation to solve the specific equation.

1. $ax + b = c$; $2x + 7 = 19$

2. $ax - b = c$; $6x - 19 = 11$

3. $a(x + b) = c$; $4(x + 3) = 24$

4. $\frac{x}{a} = b$; $\frac{x}{5} = 9$

5. $ax = bx - c$; $4x = 7x - 21$

6. $\frac{x}{a} - b = c$; $\frac{x}{10} - 2 = -3$

7. $\frac{x}{a} + b = c$; $\frac{x}{2} + 9 = 25$

8. $\frac{x + a}{b} = c$; $\frac{x + 7}{-2} = 12$

Solve the equation for *y*.

9. $8x + y = 21$

10. $y - 17x = 15$

11. $32 = 8x + 4y$

12. $36 = 9x + 6y$

13. $10x - 2y = 30$

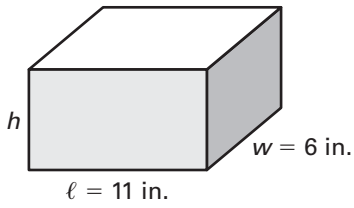
14. $4 + 2y = 10 - 12x$

15. $4y + 16 = 24x - 2y$

16. $11(15x - 3y) = 33$

17. $\frac{-2y}{x} = 7$

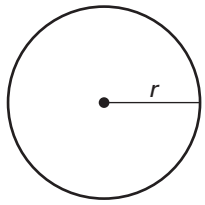
18. Volume The volume of a rectangular prism is given by the formula $V = lwh$ where l is the length, w is the width, and h is the height.



a. Solve the formula for the height h.

b. Use the rewritten formula to find the height of the rectangular prism shown, which has a volume of 660 cubic inches.

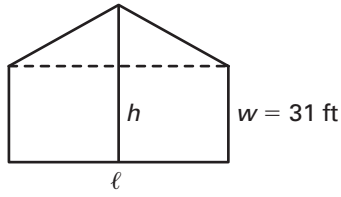
19. Circumference The circumference C of a circle is given by the formula $C = 2\pi r$ where r is the radius.



a. Solve the formula for the radius r.

b. Use the rewritten formula to find the radius of the circle shown, which has a circumference of 37.68 centimeters. Use 3.14 for π.

20. Challenge This polygon can be divided into a rectangular section and a triangular section. The rectangle has a perimeter of 214 feet and a width of 31 feet. The triangle has an area of 836 square feet.



a. In terms of l, h, and the combined area A, write a formula for the combined area of the polygon.

b. Solve the formula for h.

c. Use the rewritten formula to find h, the missing height that runs from the top of the triangle to the bottom of the rectangle.

LESSON 3.4

Name _____ Date _____

Practice

For use with pages 140–144

Tell whether the given number is a solution of $-8 > -17 + x - 14$.

1. -23 **2.** 23 **3.** 0 **4.** 25

Write an inequality that represents the verbal sentence.

5. Nine and four tenths plus a number is less than or equal to 14.1.

6. Thirty two plus a number minus 18 is greater than -3.

7. Six tenths plus 4.7 plus a number is greater than or equal to -5.6.

8. A number minus 6.88 is less than 22.74.

Match the inequality with the graph of its solution.

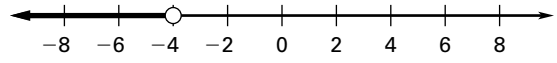
9. $x - 8 - 11 < -15$

10. $13 > -6 + 23 + x$

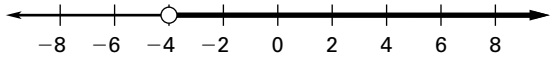
11. $10.45 + x - 5 > 1.45$

12. $4.5 + x - 4 > 4.5$

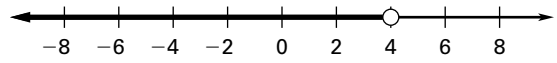
A.



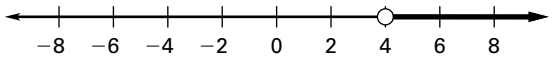
B.



C.



D.



Solve the inequality. Graph your solution.

13. $7 + x + 10 < -2$

14. $5 + x - 9 \geq 4$

15. $x - 12 - 14 \leq 6$

16. $-7 - 15 + x > -15$

17. $-23 \leq x - 18 + 25$

18. $2.9 + x + 7.5 > 6$

19. $-12.1 + 16.4 + x < -3.7$

20. $-2.87 - 4.66 + x > -7.53$

21. $-1.12 \leq x + 1.53 - 4.01$

22. $10 + 11.88 + x \leq -4.5$

23. $42.76 - 21.15 \geq x + 12.9$

24. $-140.67 < 74.9 - 101.23 + x$

25. The table shows the number of preordered tickets for a three-day showing of a play. The theater has a seating capacity of 5400 people. Write and solve an inequality that represents the possible number of tickets t that can be sold at the door for each night of the play without exceeding the seating capacity of the theater.

Night	Preorder tickets
Friday	3488
Saturday	4109
Sunday	4573

26. An elevator has a weight limit of 2000 pounds. The weights in pounds of twelve people on the elevator are shown below.

175, 140, 135, 155, 170, 190, 125, 160, 150, 150, 130, 145

a. Find the total weight of the twelve people on the elevator.

b. A thirteenth person wants to get on the elevator. Write and solve an inequality that represents the weight w that person can be without exceeding the elevator's weight limit.

LESSON 3.5

Name _____ Date _____

Practice

For use with pages 145–150

Tell whether the given number is a solution of $-1.5x > -12$.

1. -4 **2.** 12 **3.** 0 **4.** 8

Match the inequality with the graph of its solution.

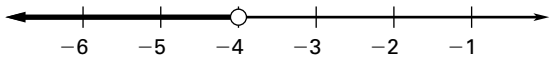
5. $\frac{x}{1.4} > -10$

6. $-3.5x > 14$

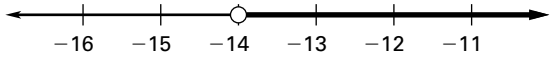
7. $\frac{x}{-1.4} > 10$

8. $-3.5x < 14$

A.



B.



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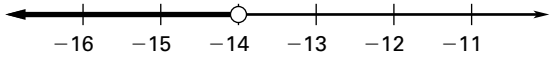
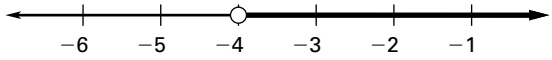


D.



Solve the inequality. Graph your solution.

9. $\frac{x}{-10} \leq 22$ **10.** $\frac{x}{25} > -30$ **11.** $-13x < -208$ **12.** $45x \leq -855$

13. $1.6x \leq -11.2$ **14.** $-5.3x > 21.2$ **15.** $-10.7 > \frac{x}{-4}$ **16.** $8.3 \leq \frac{x}{-5}$

17. $\frac{x}{1.3} \geq 7.1$ **18.** $\frac{x}{-5.6} < 2.8$ **19.** $-3.8x \geq 28.5$ **20.** $10.4x > 520$

21. $-0.1x \leq -2.5$ **22.** $-9.8x \geq 44.1$ **23.** $\frac{x}{-12.7} \geq -2.2$ **24.** $\frac{x}{4.2} < -20.45$

Write the verbal sentence as an inequality. Then solve the inequality.

25. A number divided by 3.5 is greater than or equal to 7.8.

26. The product of a number and -5 is less than -1.6.

27. The product of a number and -0.9 is greater than 27.

28. A number divided by -4.75 is greater than or equal to -20.

29. You need to complete at least 300 math problems in 4 days for a homework assignment. How many exercises should you complete each day?

30. An admission pass for an art museum is \$4.50. Write and solve an inequality to find the number of passes p that must be sold for the museum to make at least \$7200.

LESSON 3.6

Name _____ Date _____

Practice

For use with pages 151–155

Tell whether the given number is a solution of $2(3x + 1) \geq 7x + 4$.

1. -1 **2.** -2 **3.** -10 **4.** 0

Match the inequality with the graph of its solution.

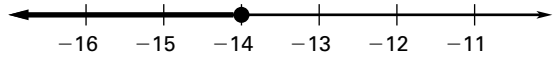
5. $3(4x - 1) \leq 10x + 25$

6. $2(14 - 3x) \leq -4x$

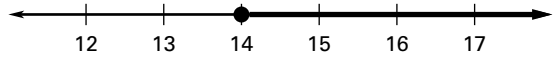
7. $-7x + 17 \geq 115$

8. $\frac{x + 4}{5} \geq -2$

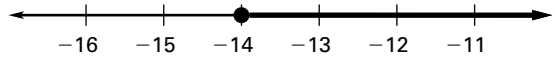
A.



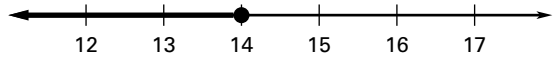
B.



C.



D.



Solve the inequality. Graph your solution.

9. $-6x - 15 > 57$

10. $22 > \frac{x}{-12} + 4$

11. $-3(2 - x) \leq 2x - 9$

12. $6(5 - 2x) < 5x + 13$

13. $\frac{3x - 1}{4} < 8$

14. $\frac{2x + 5}{3} \geq -7$

15. $\frac{-x - 11}{3} \leq 21$

16. $-8 < \frac{5x + 4}{7}$

17. $4x + 22 > -2(14 + 3x)$

18. $-4(x + 10) \geq -7x + 65$

19. $8(3x - 19) < 15x + 73$

20. $74 < \frac{-17x + 30}{5}$

21. $\frac{25x - 41}{13} \leq 18$

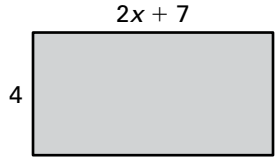
22. $12(2x - 13) > 117 - 15x$

23. $29x - 515 \leq -14(8 - 3x)$

24. The golf course you play at charges \$22 per round of golf. You can either rent golf clubs at the course for \$8 or you can buy your own set of clubs for \$160. Write and solve an inequality to find the number of rounds of golf you need to play in order for the cost of purchasing clubs to be less than the cost of renting clubs. Let r represent the number of rounds of golf.

25. For what values of x is the area of the rectangle shown greater than 100 square units?

26. For what values of x is the perimeter of the rectangle shown greater than 50 units?



LESSON 4.1

Name _____ Date _____

Practice

For use with pages 173–178

Write all the factors of the number.

1. 28 **2.** 34 **3.** 44

4. 46 **5.** 59 **6.** 65

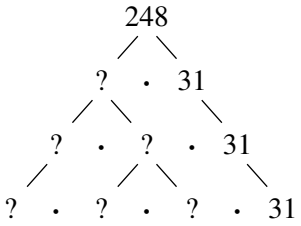
Tell whether the number is *prime* or *composite*.

7. 97 **8.** 127 **9.** 111

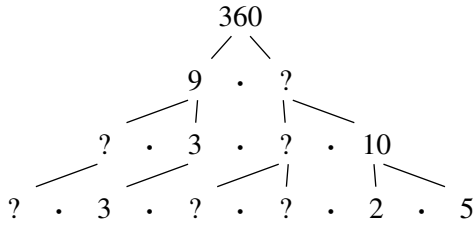
10. 99 **11.** 133 **12.** 149

Complete the factor tree. Then write the prime factorization of the number.

13.



14.



Write the prime factorization of the number.

15. 56 **16.** 69 **17.** 57

18. 77 **19.** 91 **20.** 85

21. 93 **22.** 114 **23.** 108

Factor the monomial.

24. $16x^2y$ **25.** $32b^5c^4$ **26.** $17r^2s^3$

27. $24z^2$ **28.** $40g^3h$ **29.** $57cd^4$

30. Exercise 14 shows a factor tree for 360. Make another factor tree for 360, without using 9 as a factor in the first part of the tree. Compare the results of the trees.

31. You are arranging 70 plants in a rectangular garden with the same number of plants in each row. How many ways can you arrange the garden?

32. A dog kennel groups the dogs in order to determine at what time they will be given a treat. Each group should have the same number of dogs. There are 120 dogs in the kennel. How many groups are possible?

LESSON 4.2

Name _____ Date _____

Practice

For use with pages 179–183

Find the greatest common factor of the numbers.

1. 24, 60 **2.** 28, 70 **3.** 48, 80

4. 66, 71 **5.** 25, 42 **6.** 63, 49

Find the greatest common factor of the numbers. Then tell whether the numbers are relatively prime.

7. 22, 64 **8.** 26, 65 **9.** 44, 47

10. 36, 48 **11.** 51, 68 **12.** 11, 98

Find the greatest common factor of the monomials.

13. $14m^2$, $21m$ **14.** $34n$, $8n^2$ **15.** $16t^3$, $24t^2$

16. $6x$, $9x^2$, $18x^3$ **17.** $24y^2$, $6y^2$, $8y$ **18.** $15a$, $45a^2$, $35a^4$

Tell whether the numbers are relatively prime.

19. 210, 211 **20.** 62, 121 **21.** 81, 87

Find the greatest common factor of the monomials.

22. $32xy$, $20y^2$ **23.** $33pq$, $55p^2q^2$ **24.** $16abc^2$, $28abc$

25. $52d^2e$, $12d^2f$ **26.** $12rst$, $42r^2s^3t^2$, rt^5 **27.** $9xy^2z$, $18y^3$, $6x$

28. A baseball league forms using a total of 12 coaches, 78 players, 24 baseball bats, and 96 baseballs. What is the greatest number of teams that can be formed that have equal numbers of coaches, players, baseball bats, and baseballs?

29. A food drive takes in a total of 63 cans of soup, 45 loaves of bread, 72 cans of spaghetti sauce, and 36 boxes of spaghetti. What is the greatest number of identical care packages that can be put together from the items obtained?

30. Two numbers are relatively prime. If the first number is multiplied by 3, the result is divisible by 6. Must the second number be an odd number? Explain your reasoning.

LESSON 4.3

Name _____ Date _____

Practice

For use with pages 184–188

Tell whether the fraction is in simplest form.

1. $\frac{13}{39}$ **2.** $\frac{25}{42}$ **3.** $\frac{15}{51}$

Write two fractions that are equivalent to the given fraction.

4. $\frac{5}{14}$ **5.** $\frac{7}{16}$ **6.** $\frac{18}{20}$

7. $\frac{22}{34}$ **8.** $\frac{14}{35}$ **9.** $\frac{12}{46}$

Write the fraction in simplest form.

10. $\frac{21}{24}$ **11.** $\frac{28}{30}$ **12.** $\frac{39}{52}$

13. $\frac{45}{72}$ **14.** $\frac{35}{42}$ **15.** $\frac{14}{63}$

16. You spend 3 hours every day practicing the piano. What fraction of a day do you spend practicing the piano? Give your answer in simplest form.

17. You and a friend are taking a 300-mile car trip. You have already traveled 120 miles.

a. What fraction of the trip has been completed? Give your answer in simplest form.

b. What fraction of the trip is left? Give your answer in simplest form.

Write the fraction in simplest form.

18. $\frac{60x^3y}{40x^2y^2}$ **19.** $\frac{135mn^4}{50n^2}$ **20.** $\frac{28s}{35s^2t^3}$

21. $\frac{63v^4r}{25r^2}$ **22.** $\frac{75a^3b}{245ab^3}$ **23.** $\frac{28g^3h}{56g^3h^2}$

Use a number line to determine whether the fractions are equivalent.

24. $\frac{3}{8}, \frac{8}{24}$ **25.** $\frac{1}{7}, \frac{8}{14}$ **26.** $\frac{4}{5}, \frac{16}{20}$

Write the fractions in simplest form. Tell whether they are equivalent.

27. $\frac{39}{72}, \frac{26}{48}$ **28.** $\frac{42}{56}, \frac{63}{84}$ **29.** $\frac{68}{102}, \frac{80}{96}$

LESSON 4.4

Name _____ Date _____

Practice

For use with pages 189–194

Find the least common multiple of the numbers.

1. 24, 28 **2.** 20, 36 **3.** 42, 63

4. 5, 10, 15 **5.** 9, 12, 16 **6.** 14, 21, 35

Find the least common multiple of the monomials.

7. $13b^3, 7b^2$ **8.** $8y, 18y^3$ **9.** $24a, 32a^4$

10. $31z^3, 93z^2$ **11.** $21m^2n, 84mn^3$ **12.** $50s^3t^2, 60st$

Use the LCD to determine which fraction is greater.

13. $\frac{13}{18}, \frac{16}{21}$ **14.** $\frac{17}{30}, \frac{27}{35}$ **15.** $\frac{19}{34}, \frac{19}{36}$

16. $\frac{31}{52}, \frac{37}{64}$ **17.** $\frac{9}{20}, \frac{19}{46}$ **18.** $\frac{15}{34}, \frac{29}{51}$

19. You have dance class every 3 days. Today is Monday, and you have dance class. In how many more days will you have dance class on Monday again? Use the LCM to find your answer. Then check your answer using the calendar shown. On what date will you have dance class on Monday again?

August						
S	M	Tu	W	Th	F	S
	(1)	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

20. Ginny has two vegetable gardens. In the first garden, Ginny grows tomatoes every 2 years. In the second garden, Ginny grows tomatoes every 3 years. This year, Ginny grows tomatoes in both gardens. In how many years will she grow tomatoes in both gardens again?

Order the numbers from least to greatest.

21. $\frac{19}{6}, 3\frac{5}{14}, \frac{83}{21}$ **22.** $\frac{71}{9}, \frac{239}{33}, 7\frac{2}{3}$ **23.** $\frac{11}{4}, 2\frac{16}{17}, \frac{99}{34}$

24. $\frac{47}{8}, \frac{303}{56}, 5\frac{25}{28}$ **25.** $3\frac{1}{6}, \frac{139}{45}, \frac{55}{18}$ **26.** $\frac{61}{48}, 1\frac{5}{16}, \frac{31}{24}$

Rewrite the variable expressions with a common denominator.

27. $\frac{c}{8}, \frac{c}{14}$ **28.** $\frac{3a}{4b}, \frac{b}{10a}$ **29.** $\frac{4t}{9w^2}, \frac{5}{6wt}$

LESSON 4.5

Name _____ Date _____

Practice

For use with pages 195–200

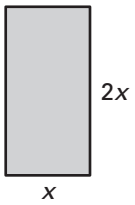
Find the product or quotient. Write your answer using exponents.

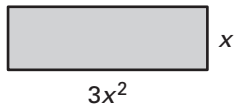
1. $5^{10} \cdot 5^{11}$
2. $4^8 \cdot 4^9$
3. $6^7 \cdot 6^2 \cdot 6^8$
4. $8^2 \cdot 8^{14} \cdot 8^3$
5. $9^{12} \cdot 9^{13}$
6. $(0.3) \cdot (0.3)^3$
7. $\frac{(0.5)^6}{(0.5)^3}$
8. $\frac{7^{20}}{7^{14}}$
9. $\frac{11^{19}}{11^{15}}$
10. $\frac{13^5}{13^2}$
11. $\frac{16^8}{16^5}$
12. $\frac{20^9}{20^7}$

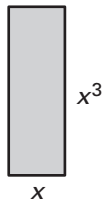
Simplify.

13. $d^4 \cdot d^4$
14. $3h^5 \cdot 4h^6$
15. $5g^2 \cdot g^{16}$
16. $8e^9 \cdot 7e^{10}$
17. $9w^3 \cdot 2w^4 \cdot w^2$
18. $0.2y^3 \cdot 0.5y^6$
19. $\frac{-0.6x^7}{0.3x^5}$
20. $\frac{9y^{18}}{15y^2}$
21. $\frac{12s^9}{32s^2}$
22. $\frac{15z^{11}}{18z^7}$
23. $\frac{30a^5 \cdot a^3}{12a}$
24. $\frac{6h^{11} \cdot (-7h^6)}{-28h^3}$

Find the area of the rectangle.

25. 

26. 

27. 

28. A file on the hard drive of a computer is 3^2 kilobytes. Another file is 3^7 kilobytes. How many times larger is the second file than the first file? Write your answer using an exponent.

Find the missing exponent.

29. $u^{22} \cdot u^{18} = u^{?}$
30. $d^{?} \cdot d^{13} = d^{24}$
31. $f^8 \cdot f^{?} = f^{33}$
32. $\frac{x^{29}}{x^9} = x^{?}$
33. $\frac{m^{?}}{m^9} = m^{15}$
34. $\frac{r^{31}}{r^{?}} = r^{17}$

LESSON 4.6

Name _____ Date _____

Practice

For use with pages 201–205

1. Which expression is *not* equivalent to $x^3 \cdot x^{-7}$?

A. x^{-4} **B.** $\frac{1}{x^4}$ **C.** $\frac{x^7}{x^3}$ **D.** $\frac{x^3}{x^7}$

Write the expression using only positive exponents.

2. 14^{-3} **3.** 9^{-7} **4.** 18^{-5}

5. ab^0 **6.** $0.24a^{-3}$ **7.** m^4n^{-2}

Write the expression without using a fraction bar.

8. $\frac{1}{27}$ **9.** $\frac{1}{81}$ **10.** $\frac{1}{63}$

11. $\frac{5}{t^4}$ **12.** $\frac{6z}{y^5}$ **13.** $\frac{11p^2}{q^6}$

Find the product. Write your answer using only positive exponents.

14. $22^0 \cdot 22^4$ **15.** $8^5 \cdot 8^{-6}$ **16.** $12^{-4} \cdot 12^{-7}$

17. $3w^{-9} \cdot w^4$ **18.** $9h^{-2} \cdot 5h^{10}$ **19.** $0.4m^{-2} \cdot 0.6m^{-9}$

20. Scientists have created a 10-nanometer transistor for use in computers. A nanometer is 10^{-9} meter. What is the length of the transistor in meters?

21. Write the number $\frac{1}{10{,}000{,}000}$ as a power of 10 using a negative exponent.

22. A milligram is 10^{-3} gram. A kilogram is 10^3 grams. How many times the mass of a milligram is the mass of a kilogram?

Find the quotient. Write your answer using only positive exponents.

23. $\frac{0.8a^{-20}}{0.2a^9}$ **24.** $\frac{30u^{-15}}{34u^{-16}}$ **25.** $\frac{19k^{-10}}{k^{16}}$

26. $\frac{14r^3}{r^{-8}}$ **27.** $\frac{c^{10}d^0}{c^9d^5}$ **28.** $\frac{w^3y^{13}}{w^{11}y^6}$

Use a calculator to evaluate the expression. If necessary, round the result to the nearest thousandth.

29. $(6.5)^{-3}$ **30.** $(9.4)^{-3}$ **31.** $(7.4)^{-2}$

FOCUS ON **4.7**

Name _____ Date _____

Practice

For use with pages 205A–205B

1. **Writing** Explain how to write 40,000,000 using a power of 10.

Write the number using a power of 10.

2. 300,000
3. 7000
4. 10,000,000,000
5. 50,000
6. 800
7. 200,000,000
8. 0.00009
9. 0.6
10. 0.008
11. 0.000000003
12. 0.04
13. 0.000007
14. **Thickness** The thickness of aluminum foil is 0.0005 inch. Write this number using a power of 10.
15. **Population** The population of the United States is about 300,000,000. Write this number using a power of 10.
16. **States** Alaska has an area of about 600,000 square miles. Delaware has an area of about 2000 square miles. About how many times greater is the area of Alaska than the area of Delaware?
17. **Diameter** The diameter of Earth is about 13,000 kilometers. The diameter of the moon is about 3000 kilometers. About how many times greater is the diameter of Earth than the diameter of the moon?
18. **Challenge** The Statue of Liberty weighs about 450,000 pounds. The pedestal that she stands on weighs about 27,000 tons. About how many times greater is the weight of the pedestal than the weight of the Statue of Liberty?

LESSON 4.7

Name _____ Date _____

Practice

For use with pages 206–211

Write the number in scientific notation.

1. 1250 **2.** 205,000 **3.** 0.0035

4. 0.00058 **5.** 5,220,000 **6.** 0.000064

Write the number in standard form.

7. 5.3×10^2 **8.** 7.2×10^{-2} **9.** 4.3×10^{-3}

10. 1.2×10^5 **11.** 9.45×10^{-5} **12.** 6.32×10^6

Complete the statement using <, >, or =.

13. 1.8×10^2 __?__ 1800 **14.** 43,000 __?__ 4.3×10^3

15. 6.9×10^{-3} __?__ 0.0068 **16.** 1.8×10^{-4} __?__ 0.0018

Find the product. Write your answer in scientific notation.

17. $(6 \times 10^2)(3 \times 10^3)$ **18.** $(4.5 \times 10^3)(2 \times 10^4)$

19. $(4 \times 10^{-3})(2.4 \times 10^7)$ **20.** $(2.5 \times 10^{-2})(5 \times 10^{-3})$

21. The sun has a diameter of 1.39×10^6 kilometers. The diameter of Earth is 1.28×10^4 kilometers. How many times larger is the sun's diameter than the Earth's diameter? Give your answer in scientific notation.

Order the numbers from least to greatest.

22. 2400; 2.5×10^2; 2.3×10^3 **23.** 4.8×10^5; 481,000; 4.7×10^5

24. 0.036; 3.5×10^{-2}; 3.7×10^{-2} **25.** 8.3×10^{-4}; 0.0084; 8.2×10^{-4}

Write the number in scientific notation.

26. Volume (in cubic kilometers) of water in Lake Michigan: 4920

27. Approximate density (in grams per milliliter) of one helium atom: 0.0001787

Write the number in standard form.

28. Floor area (in square meters) of the Sears Tower in Chicago: 4.16×10^5

29. Approximate width (in meters) of a United States dollar bill: 6.6294×10^{-2}

30. Volume (in cubic meters) of a mole of helium atoms: 2.1×10^{-5}

FOCUS ON **4.7**

Name _____ Date _____

Practice

For use with pages 210A–210B

Evaluate. Write your answer in scientific notation.

1. $(3 \times 10^4) \times (3 \times 10^2)$

2. $(7.2 \times 10^7) \times (5 \times 10^3)$

3. $(9 \times 10^{-3})\,(2.6 \times 10^{-2})$

4. $(3.1 \times 10^{-1})\,(6.8 \times 10^{-5})$

5. $(1.15 \times 10^5)\,(6.1 \times 10^{-8})$

6. $(4.21 \times 10^{-2})\,(3.18 \times 10^7)$

7. $\dfrac{8 \times 10^{12}}{2 \times 10^5}$

8. $\dfrac{4.16 \times 10^{-6}}{5.2 \times 10^{-3}}$

9. $\dfrac{8.1 \times 10^3}{1.35 \times 10^8}$

10. $\dfrac{1.96 \times 10^{-2}}{9.8 \times 10^{-4}}$

11. $\dfrac{2.24 \times 10^{-5}}{7 \times 10^1}$

12. $\dfrac{(3.2 \times 10^7)\,(6.875 \times 10^{-10})}{(2 \times 10^{-4})}$

13. $(4.3 \times 10^2) + (8.27 \times 10^3)$

14. $(7.87 \times 10^{-10}) + (3.561 \times 10^{-8})$

15. $(9.36 \times 10^7) - (2.8 \times 10^5)$

16. $(5.591 \times 10^{-4}) - (6.29 \times 10^{-5})$

17. **Area** The length of a rectangle is 7.5×10^8 meters and the width is 2.01×10^6 meters. What is its area?

18. **Perimeter** A pentagon has side lengths of 1.4×10^5, 8.5×10^3, 7.73×10^4, 1.02×10^5, and 9.168×10^4 inches. Find the perimeter of the pentagon.

19. **Earth** Earth revolves around the sun at a rate of about 1.073×10^5 kilometers per hour. How many meters will Earth travel around the sun in 10.5 days?

20. **Challenge** The local electric company charges \$.0553 per kilowatt hour to generate the electricity, \$.00624 per kilowatt hour to transmit the electricity, and \$.0395 per kilowatt hour to distribute the electricity. Over the last three months, your household used 570, 409, and 454 kilowatt hours of electricity.

a. Write each number in scientific notation.

b. Using scientific notation, write and solve an equation to find the total amount of money due to the electric company for the last three months of service.

c. On average, what would you expect to pay the electric company each month?

LESSON 5.1

Name _____ Date _____

Practice

For use with pages 221–226

Show that the number is rational by writing it as a quotient of two integers.

1. 273 **2.** -86 **3.** $6\frac{9}{10}$ **4.** $-9\frac{1}{12}$

5. 3400 **6.** -555 **7.** $-2\frac{7}{20}$ **8.** $4\frac{11}{14}$

Write the fraction or mixed number as a decimal.

9. $\frac{8}{25}$ **10.** $-\frac{5}{18}$ **11.** $-3\frac{2}{11}$ **12.** $8\frac{3}{20}$

13. $\frac{34}{3}$ **14.** $-\frac{29}{4}$ **15.** $6\frac{37}{100}$ **16.** $-2\frac{9}{40}$

17. $-\frac{7}{18}$ **18.** $\frac{39}{26}$ **19.** $5\frac{14}{15}$ **20.** $-10\frac{7}{36}$

Write the decimal as a fraction or mixed number.

21. 0.65 **22.** 0.04 **23.** -5.28 **24.** 14.005

25. $-8.\overline{4}$ **26.** $0.\overline{16}$ **27.** $-0.1\overline{3}$ **28.** $3.7\overline{6}$

Order the numbers from least to greatest.

29. $-\frac{6}{11}, -0.55, -0.\overline{5}, -\frac{27}{50}$

30. $0.69, \frac{13}{20}, \frac{1}{2}, 0.6, \frac{17}{25}$

31. $-1.5, -\frac{7}{4}, -\frac{8}{5}, -1.7, -0.\overline{8}, -\frac{11}{6}$

32. $4.41, \frac{43}{10}, 4.1, 4.02, \frac{17}{4}, 4\frac{1}{5}$

33. On Monday, a deli takes 250 orders. Of these, 144 are carry-out orders. On Tuesday, it takes 220 orders. Of these, 125 are carry-out orders. Which day has the greater fraction of carry-out orders?

In Exercises 34–36, use the table that shows the results of a survey about the kind of fruit that students like best.

Favorite fruit	Orange	Banana	Pear	Strawberry	Apple
Portion of students	$\frac{7}{25}$	$\frac{2}{5}$	$\frac{7}{100}$	$\frac{1}{12}$	$\frac{1}{6}$

34. Write each fraction as a decimal. Tell whether the decimal form of the fraction is repeating or terminating.

35. Which fruit was chosen most often?

36. Is it easier to compare the survey results in fraction form or decimal form? Explain.

FOCUS ON 5.1

Name _____ Date _____

Practice

For use with pages 227–228

1. Make a conjecture about the product of two prime numbers. Give a convincing argument to show that the conjecture is true.
2. Make a conjecture about the product of two even numbers. Give a convincing argument to show that the conjecture is true.
3. Make a conjecture about the factors of an odd product. Give a convincing argument to show that the conjecture is true.
4. What pattern do you observe in the decimal forms of $\frac{1}{8}$, $\frac{2}{8}$, $\frac{3}{8}$, and $\frac{4}{8}$? Give a convincing argument that the pattern holds for $\frac{a}{8}$ where a is any whole number from 1 to 7.
5. A student makes the conjecture below. Give a convincing argument to show that the conjecture is true.

   Conjecture: If a length in centimeters is a whole number, that length in millimeters will also be a whole number.

Show that the conjecture is false by finding a counterexample.

6. If the product of two numbers is positive, then both numbers are positive.
7. The sum of two prime numbers is a composite number.
8. The quotient of any two even integers $n \div m$ where $n > m$ is a whole number.
9. If the denominator of a fraction is rational, then the fraction is rational.
10. The product of an odd number and any number is an odd number.
11. The product of two whole numbers is greater than either number.
12. For any number n, n^3 is greater than n.
13. Any integer divisible by 9 is also divisible by 6.
14. All numbers are either prime or composite.
15. Any number raised to a positive power is positive.
16. **Challenge** A student makes the conjecture below. Is the conjecture true? If so, give a convincing argument to show that the conjecture is true. If not, show that the conjecture is false by finding a counterexample.

    Conjecture: The sum of any three consecutive integers is either greater than or less than each integer.

LESSON 5.2

Name _____ Date _____

Practice

For use with pages 229–233

Find the sum or difference.

1. $\frac{12}{13} + \frac{12}{13}$

2. $\frac{1}{10} - \frac{9}{10}$

3. $-\frac{13}{32} + \left(-\frac{13}{32}\right)$

4. $\frac{34}{43} - \left(-\frac{12}{43}\right)$

5. $-\frac{11}{30} - \left(-\frac{7}{30}\right)$

6. $-\frac{17}{50} + \frac{19}{50}$

7. $\frac{43}{100} - \left(-\frac{17}{100}\right)$

8. $\frac{9}{80} - \frac{51}{80}$

9. $8\frac{7}{10} + 3\frac{9}{10}$

10. $5\frac{1}{7} - 6\frac{2}{7}$

11. $3\frac{1}{15} - 7\frac{11}{15}$

12. $1\frac{2}{9} - 12\frac{7}{9}$

13. $24\frac{17}{22} - 16\frac{5}{22}$

14. $\frac{4}{5} - \left(-3\frac{4}{5}\right)$

15. $20\frac{5}{6} + \left(-18\frac{5}{6}\right)$

16. $-4\frac{11}{16} - \frac{15}{16}$

Simplify the expression.

17. $\frac{7x}{20} + \frac{17x}{20}$

18. $\frac{19x}{28} + \frac{x}{28}$

19. $-\frac{9}{14x} + \frac{17}{14x}$

20. $-\frac{4x}{45} - \frac{41x}{45}$

21. $\frac{4}{x} - \frac{11}{x}$

22. $\frac{7}{24x} + \left(-\frac{5}{24x}\right)$

23. $\frac{11}{12x} - \left(-\frac{5}{12x}\right)$

24. $\frac{8}{5x} + \frac{3}{5x} - \left(-\frac{4}{5x}\right)$

Evaluate the expression.

25. $\frac{1}{12} + \frac{5}{12} + \frac{11}{12}$

26. $\frac{5}{8} + \frac{7}{8} + \left(-\frac{3}{8}\right)$

27. $-\frac{9}{14} + \frac{3}{14} + \frac{5}{14}$

28. $\frac{4}{7} - \left(-\frac{2}{7}\right) + \frac{5}{7}$

29. $-\frac{7}{9} - \frac{4}{9} - \frac{2}{9}$

30. $-\frac{9}{20} + \frac{11}{20} - \left(-\frac{3}{20}\right)$

31. You have a piece of wood that is $7\frac{3}{4}$ feet long. You want to cut one piece that is $3\frac{7}{12}$ feet long and one piece that is $4\frac{1}{12}$ feet long. Do you have enough wood? Explain.

32. You run the 60-yard dash in $7\frac{9}{20}$ seconds. Your friend runs it in $6\frac{19}{20}$ seconds. How much faster is your friend's time?

33. Three puppies weigh $1\frac{1}{16}$ pounds, $1\frac{3}{16}$ pounds, and $\frac{15}{16}$ pound. You are carrying all three in a basket. Find the total weight of the three puppies.

LESSON 5.3

Name _____ Date _____

Practice

For use with pages 235–239

Find the sum or difference.

1. $\frac{7}{12} + \frac{7}{10}$ **2.** $\frac{8}{9} + \left(-\frac{10}{21}\right)$ **3.** $-\frac{4}{17} + \frac{3}{5}$ **4.** $-\frac{3}{4} - \left(-\frac{5}{18}\right)$

5. $-\frac{1}{6} - \frac{9}{22}$ **6.** $-\frac{11}{12} - \frac{7}{15}$ **7.** $\frac{9}{20} - \frac{3}{16}$ **8.** $-\frac{5}{14} - \left(-\frac{9}{10}\right)$

Evaluate the expression when $x = \frac{5}{6}$ and $y = -\frac{3}{10}$.

9. $x + y$ **10.** $x - y$ **11.** $y - x$ **12.** $-y - x$

Find the sum or difference.

13. $5\frac{2}{7} + 7\frac{1}{6}$ **14.** $4\frac{5}{9} - 3\frac{2}{15}$ **15.** $-2\frac{8}{9} + 2\frac{5}{6}$ **16.** $-1\frac{5}{8} - \left(-2\frac{1}{5}\right)$

17. $1\frac{3}{4} - 4\frac{3}{14}$ **18.** $-6\frac{3}{25} + 3\frac{1}{2}$ **19.** $4\frac{9}{16} + \left(-3\frac{3}{10}\right)$ **20.** $-1\frac{2}{3} - \left(-1\frac{4}{11}\right)$

Evaluate the expression when $x = -4\frac{1}{6}$ and $y = 1\frac{11}{16}$.

21. $x + y$ **22.** $x - y$ **23.** $y - x$ **24.** $-y - x$

Simplify the expression.

25. $-\frac{7x}{6} - \frac{x}{5}$ **26.** $\frac{x}{8} + \frac{5x}{3}$ **27.** $-\frac{2x}{9} + \frac{7x}{15}$ **28.** $\frac{4x}{7} - \frac{8x}{5}$

29. A baby weighs $7\frac{1}{8}$ pounds at birth. After four months, the baby weighs $15\frac{2}{3}$ pounds. How much weight did the baby gain?

30. In a bag of marbles, $\frac{2}{5}$ are red, $\frac{2}{7}$ are green, and the rest are blue. What fraction of the marbles are blue?

31. An ice sculpture originally has a height of $74\frac{1}{4}$ inches. The ice sculpture begins to melt and after several hours, the height has decreased by $8\frac{7}{16}$ inches. What is the current height of the sculpture?

FOCUS ON **5.3**

Name _____ Date _____

Practice

For use with pages 239A–239B

Use a number line to find the distance between the two rational numbers.

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

2. $\frac{5}{8}, 2\frac{1}{4}$

3. $-1\frac{3}{4}, \frac{1}{6}$

4. $1\frac{1}{2}, -0.7$

5. $-1.3, \frac{1}{5}$

6. $-0.25, 1\frac{1}{8}$

Evaluate the expressions $a - b$ and $b - a$ for the given values.

7. $a = -\frac{2}{5}, b = \frac{1}{10}$

8. $a = -\frac{5}{8}, b = \frac{1}{2}$

9. $a = -\frac{1}{2}, b = \frac{5}{6}$

10. $a = -\frac{1}{3}, b = \frac{1}{5}$

11. $a = -\frac{7}{9}, b = -\frac{1}{3}$

12. $a = -\frac{4}{7}, b = \frac{2}{3}$

13. $a = -0.4, b = 0.75$

14. $a = -0.3, b = 1.65$

15. **Tolerance** A machine part has an ideal length of 40 millimeters with a tolerance of 0.25 millimeter. The actual length L must satisfy the inequality $|L - 40| \leq 0.25$ to be accepted. Tell whether a machine part should be accepted or rejected when

a. $L = 40.16$ mm, **b.** $L = 39.63$ mm, and **c.** $L = 39.86$ mm.

16. **Challenge** A machine part has an ideal length of 15.85 millimeters. Of the following 6 samples taken, 3 would be accepted and 3 would be rejected.

15.36 mm, 15.42 mm, 15.46 mm, 15.89 mm, 16.03 mm, 16.27 mm

a. Which three samples will be accepted? Which three samples will be rejected? Explain.

b. Using the samples above, what would be the minimum possible tolerance given to this part? What would be the maximum possible tolerance? Round your answers to the nearest hundredth.

LESSON 5.4

Name _____ Date _____

Practice

For use with pages 241–245

Find the product.

1. $\frac{14}{25} \cdot \left(-\frac{3}{7}\right)$ **2.** $-\frac{20}{33} \cdot \left(-\frac{3}{11}\right)$ **3.** $51 \cdot \left(-\frac{5}{6}\right)$ **4.** $-\frac{7}{22} \cdot (-4)$

5. $2\frac{1}{12} \cdot \left(-10\frac{4}{5}\right)$ **6.** $-6\frac{3}{16} \cdot 5\frac{3}{7}$ **7.** $-1\frac{4}{27} \cdot \left(-3\frac{6}{11}\right)$ **8.** $-5\frac{1}{9} \cdot 2\frac{4}{13}$

Evaluate the expression.

9. $\frac{1}{4} \cdot \frac{8}{9} \cdot \left(-\frac{3}{5}\right)$ **10.** $\frac{4}{7} \cdot \left(-\frac{1}{8}\right) - \frac{3}{4}$ **11.** $\frac{7}{10} \cdot \frac{2}{9} + \frac{2}{3}$

Simplify the expression.

12. $\frac{20x}{9} \cdot \frac{36x^4}{5}$ **13.** $\frac{75x^4}{8} \cdot \frac{14x}{3}$ **14.** $-\frac{8x}{15} \cdot \left(-\frac{4x}{7}\right)$ **15.** $-\frac{x^6}{11} \cdot \left(-\frac{5x^8}{3}\right)$

16. $-\frac{13x^2}{10} \cdot \frac{6x^3}{5}$ **17.** $-\frac{x^6}{12} \cdot \left(-\frac{11x^5}{12}\right)$ **18.** $\frac{xy}{6} \cdot \frac{2x^3y}{3}$ **19.** $-\frac{x^2y}{4} \cdot \frac{10y^2}{3}$

Evaluate or simplify the expression.

20. $\left(-\frac{7}{4}\right)^0$ **21.** $\left(\frac{8}{8}\right)^{-1}$ **22.** $\left(\frac{a}{9}\right)^2$ **23.** $\left(-\frac{2}{t}\right)^3$

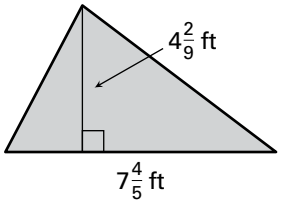
Evaluate the expression when $x = -\frac{2}{3}$, $y = \frac{9}{14}$ and $z = -\frac{23}{42}$.

24. $x \cdot y + z$ **25.** $y + x \cdot z$ **26.** $x \cdot y \cdot z$ **27.** $z - y \cdot x$

28. A shoreline is eroding at a rate of $2\frac{5}{18}$ feet each year. At this rate, how many feet will the shoreline erode in 8 years?

Find the area of the triangle.

29.



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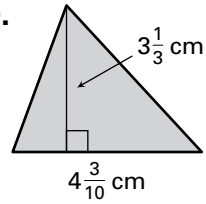


31. In a class election, $\frac{5}{6}$ of the students have already voted. Of those students, $\frac{11}{17}$ have voted for Cindy. There are 102 students in the class. How many students voted for Cindy?

FOCUS ON 5.4

Name _____ Date _____

Practice

For use with pages 246–247

Convert the temperature to degrees Celsius.

1. 53.6°F **2.** 41°F **3.** 86°F **4.** 112°F

5. 24.8°F **6.** 194°F **7.** 14°F **8.** −13°F

Convert the temperature to degrees Fahrenheit.

9. 16°C **10.** 50°C **11.** −6°C **12.** 5.5°C

13. 30°C **14.** 0°C **15.** −20°C **16.** −55°C

17. Average Temperature The average temperature in Phoenix, Arizona, for the month of July is about 94°F. Convert this temperature to degrees Celsius.

18. Mars The average recorded temperature on Mars is −63°C. Convert this temperature to degrees Fahrenheit.

19. Human Being The normal body temperature of a resting human being is 98.6°F. Convert this temperature to degrees Celsius.

20. Challenge The boiling point of fluorine is −306.62°F. The boiling point of argon is −185.85°C. The boiling point of oxygen is −297.31°F. The boiling point of nitrogen is −195.79°C. In degrees Fahrenheit and in degrees Celsius, determine the difference between the lowest and highest boiling points. Which difference is greater? *Explain* why this difference is greater.

LESSON 5.5

Name _____ Date _____

Practice

For use with pages 248–252

State the reciprocal of the number.

1. $-\frac{24}{7}$ **2.** -264 **3.** 3.45 **4.** 0.01

Find the quotient.

5. $\frac{7}{20} \div \frac{5}{6}$ **6.** $-\frac{11}{24} \div \frac{7}{10}$ **7.** $\frac{8}{33} \div \left(-\frac{8}{9}\right)$ **8.** $-\frac{7}{5} \div \frac{19}{40}$

9. $8\frac{9}{20} \div 1\frac{7}{40}$ **10.** $10\frac{9}{14} \div \left(-3\frac{1}{2}\right)$ **11.** $\frac{16}{25} \div 2$ **12.** $48 \div \left(-\frac{4}{5}\right)$

13. $12\frac{3}{4} \div \left(-\frac{11}{12}\right)$ **14.** $5\frac{7}{11} \div 20$ **15.** $-24\frac{4}{9} \div \frac{8}{15}$ **16.** $-\frac{10}{33} \div 12$

17. $-\frac{18}{35} \div \left(-2\frac{4}{5}\right)$ **18.** $30 \div \left(-4\frac{1}{8}\right)$ **19.** $8\frac{7}{10} \div \frac{33}{50}$ **20.** $-\frac{15}{26} \div \left(-\frac{5}{14}\right)$

Evaluate the expression when $x = -2\frac{5}{8}$, $y = \frac{3}{10}$, and $z = 6\frac{3}{4}$.

21. $x \div y$ **22.** $y \div z$ **23.** $x \div z$ **24.** $z \div x \cdot y$

Evaluate the expression.

25. $\frac{4}{9} \div \frac{1}{3} + \frac{7}{10}$ **26.** $\frac{5}{8} + \frac{5}{12} \div \frac{10}{21}$ **27.** $-\frac{3}{16} \div \left(\frac{3}{4} + \frac{5}{6}\right)$

28. $\frac{23}{41} \div \frac{25}{82} - \frac{3}{10}$ **29.** $6\frac{7}{8} \div 1\frac{5}{6} + \frac{11}{20}$ **30.** $\frac{6}{13} \div \frac{3}{5} \cdot \frac{3}{4}$

31. $-\frac{5}{6} \cdot \left(-\frac{9}{10}\right) \div \frac{17}{20}$ **32.** $\frac{7}{18} \cdot \left(-\frac{10}{21}\right) \div \frac{11}{9}$ **33.** $\frac{7}{24} \div \left(\frac{11}{12} - \frac{5}{9}\right)$

34. Evaluate the expression $x^2 \div y$ when $x = -\frac{5}{9}$ and $y = -10$.

35. Evaluate the expression $x^2 \div y^2$ when $x = \frac{7}{12}$ and $y = -\frac{7}{18}$.

36. You have a piece of wood that is $23\frac{3}{8}$ feet long. You need to cut pieces that are $1\frac{3}{8}$ feet long. How many pieces can you cut?

FOCUS ON **5.5**

Name _____ Date _____

Practice

For use with pages 252A–252B

Evaluate the expression. Justify your steps.

1. $4.2 + 6.7 - 4.2$

2. $\frac{3}{7} + \frac{4}{7} + \left(-\frac{1}{4}\right)$

3. $\frac{3}{8} + 0 + \frac{1}{8}$

4. $\frac{1}{10} \cdot \frac{8}{3} \div \frac{24}{5}$

5. $-4 \cdot 10.3 \cdot 0.5$

6. $1 \cdot \frac{10}{3} \cdot \frac{2}{5}$

7. $12.86 + 18.35 - 9.25$

8. $\frac{4}{11}\left(\frac{3}{8} - \frac{1}{4}\right) + \frac{3}{11}$

Simplify the expression. Justify your steps

9. $0.8 + 2.2 + m$

10. $5 + \frac{1}{2}x + \frac{2}{3}$

11. $\left(\frac{4}{7}b\right)(-3) \div \frac{12}{5}$

12. $\frac{4}{5}x + \frac{2}{5} + \frac{1}{5} - \frac{3}{5}x$

13. $0.45 + 0.9\,(a - 0.5)$

14. $4.5\,(2t + 3) - 6.2t$

15. **Cost** You buy two movies for $9.50 each and one video game for $22.49. You have a $5.00 off coupon for the video game. Use the properties of addition to find how much money you spend.

16. **Job** You have a part-time job bagging groceries. You are paid $8.25 per hour and are scheduled for 15 hours per week. Use the properties of multiplication to find how much money you will earn after 8 weeks of work.

17. **Challenge** A project requires the following pieces of wood be cut from a length of wood: 3 pieces that are $6\frac{1}{2}$ inches long, 2 pieces that are $2\frac{7}{8}$ inches long, and 6 pieces that are $1\frac{3}{4}$ inches long. Assume $\frac{1}{16}$ inch of wood is wasted on each cut.

a. How long of a piece of wood do you need for the project?

b. If wood is sold by the foot, how long of a piece do you have to buy?

FOCUS ON **5.5**

Name _____ Date _____

Practice

For use with pages 252C–252D

Evaluate the expression. Use mental math and estimation to assess the reasonableness of your answer.

1. $5.3 - 2 + 8.9$

2. $15.3 + 18.1 + 9$

3. $8.7 + 5\frac{1}{4} + 2.4$

4. $4\frac{11}{12} - 25 - 7.25$

5. $1\frac{5}{6} - \left(4\frac{1}{2} - 3.7\right)$

6. $18\frac{2}{3} - \left(14.2 + 2\frac{2}{5}\right)$

7. Shopping You buy a sweater for $30.99, a pair of shoes for $46.79, a book bag for $15.20, and a DVD for $8.00. While in the checkout line, you guess that your total bill before tax will be about $80. Is $80 a reasonable answer? Explain.

8. Homework Your teacher assigns you 130 pages to read in a book over the weekend. Friday night you read $28\frac{1}{2}$ pages, Saturday morning you read $42\frac{3}{4}$ pages, and Saturday night you read 18 pages. You tell your parents that you only have about 40 pages left to read. Is this a reasonable estimate? Explain.

9. Weather Over the last 5 days, it was reported that 1.05 inches, $2\frac{2}{5}$ inches, 0.2 inch, $\frac{1}{8}$ inch, and 1.32 inches of rain fell. The weatherman claimed that a total of about 5 inches of rain had fallen that week. Did he give a reasonable estimate? Explain.

10. Challenge Julia is paid an hourly wage. Last year she made about $28,000 before taxes were taken out. She works 40 hours per week (8 hours a day, 5 days a week), except once a month she gets half of a day off that she does not get paid for. After taxes are taken out, Julia keeps about $\frac{3}{4}$ of her pay. She says that she brings home about $1700 each month. Is this a reasonable statement? Explain.

LESSON 5.6

Name _____ Date _____

Practice

For use with pages 253–258

Solve the equation. Check your solution.

1. $\frac{5}{8}x = 30$

2. $\frac{7}{11}x = 14$

3. $-\frac{7}{12}x = 14$

4. $28 = \frac{14}{15}x$

5. $-\frac{5}{6}x = 20$

6. $-24 = -\frac{12}{19}x$

7. $\frac{7}{11}x = \frac{4}{11}$

8. $\frac{4}{5}x = \frac{7}{5}$

9. $\frac{9}{10}x = \frac{2}{5}$

10. $-\frac{3}{4}x = \frac{11}{32}$

11. $\frac{3}{14} = -\frac{11}{21}x$

12. $-\frac{7}{13}x = \frac{5}{26}$

Solve the equation. Check your solution.

13. $\frac{1}{2}x + 9 = 36$

14. $\frac{4}{7}x + 8 = 28$

15. $6 = \frac{1}{2}x - \frac{1}{4}$

16. $-\frac{2}{3}x + (-10) = 14$

17. $32 = 16 - \frac{1}{2}x$

18. $29 = \frac{9}{11}x + 11$

19. $-\frac{14}{17}x + \frac{13}{17} = \frac{12}{17}$

20. $\frac{5}{11}x + \frac{4}{11} = \frac{3}{11}$

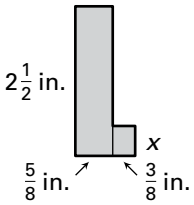
21. $\frac{8}{19} = -\frac{10}{19}x - \frac{9}{19}$

22. $\frac{2}{3}x + \frac{5}{9} = \frac{4}{9}$

23. $\frac{1}{2} = \frac{9}{14}x - \frac{4}{7}$

24. $\frac{8}{21} = -\frac{10}{21}x + \frac{3}{7}$

25. The figure is composed of two rectangles. The area of the figure is $1\frac{3}{4}$ square inches.



a. Find the area of the larger rectangle.

b. Write an expression for the area of the smaller rectangle.

c. Write an equation relating the sum of the areas in parts (a) and (b) to the total area of the figure. Solve the equation to find the value of x.

26. The weight of a bull calf is 388 kilograms. If its weight increases at a rate of $1\frac{2}{5}$ kilograms per day, how long it will take the bull calf to reach a weight of 500 kilograms?

LESSON 5.7

Name _____ Date _____

Practice

For use with pages 259–263

Solve the equation by first clearing the fractions.

1. $-\frac{17}{31}x + \frac{7}{31} = \frac{15}{31}$

2. $\frac{1}{12} - \frac{2}{3}x = \frac{1}{3}$

3. $\frac{8}{17}x + \frac{5}{34} = \frac{6}{17}$

4. $\frac{2}{3} = \frac{7}{9}x + \frac{11}{36}$

5. $\frac{1}{6} - \frac{1}{3}x = \frac{2}{3}$

6. $\frac{6}{11} = \frac{1}{4} + \frac{7}{11}x$

7. $\frac{2}{3}x - \frac{1}{6} = \frac{2}{7}$

8. $\frac{7}{20} = \frac{1}{6} + \frac{1}{2}x$

9. $\frac{5}{16} = \frac{1}{6} - \frac{7}{12}x$

Solve the equation by first clearing the decimals.

10. $2.3x + 9.2 = 23$

11. $9.6 - 2.4x = -24$

12. $-3.9 = 2.6x + 1.56$

13. $6.1x + 20.74 = -51.85$

14. $26.4 = 6.6x + 10.56$

15. $4.5x + 15.3 = -38.25$

16. $1.55 = -3.1x - 0.62$

17. $81.9 = 32.76 + 9.1x$

18. $-0.24 = 0.96 - 0.6x$

Solve the inequality.

19. $\frac{1}{4} \leq \frac{1}{16} - \frac{1}{2}x$

20. $-\frac{5}{9}x - \frac{1}{9} < \frac{1}{3}$

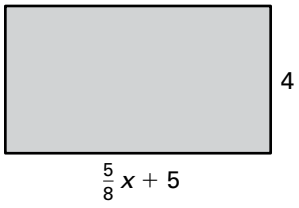
21. $\frac{8}{17}x + \frac{5}{34} > \frac{6}{17}$

22. $\frac{9}{40} - \frac{3}{5}x < \frac{1}{2}$

23. $\frac{1}{5} \leq \frac{1}{15} - \frac{1}{2}x$

24. $\frac{1}{5} \geq \frac{1}{6} - \frac{2}{3}x$

25. Describe the possible values of x if the area of the rectangle is at least 40 square inches.



26. You need to exchange some of your U.S. dollars for European euros (€). For every U.S. dollar, suppose you get €0.866 in European euros. If you already have €187.22 in European euros, how much in U.S. dollars do you need to exchange to have €360.42 in European euros?

LESSON 6.1

Name _____ Date _____

Practice

For use with pages 275–280

Tell whether the ratio is in simplest form. If not, write it in simplest form. Then, write the ratio in two other ways.

1. 4 to 18

2. 4 : 6

3. $\frac{7}{9}$

4. $\frac{39}{13}$

5. 28 : 21

6. 17 to 44

7. 44 : 16

8. 63 to 18

9. $\frac{48}{28}$

Order the ratios from least to greatest.

10. 7 : 2, 12 to 4, $\frac{20}{6}$, 21 to 14, 10 : 5

11. $\frac{12}{16}$, 7 to 10, 8 : 12, 9 to 15, $\frac{4}{18}$

Find the unit rate.

12. $\frac{72 \text{ people}}{3 \text{ buses}}$

13. $\frac{20 \text{ ounces}}{2.5 \text{ servings}}$

14. $\frac{288 \text{ mi}}{12 \text{ gal}}$

15. $\frac{10.4 \text{ gal}}{4 \text{ min}}$

16. $\frac{1125 \text{ calories}}{4.5 \text{ hours}}$

17. $\frac{\$375}{15 \text{ shares}}$

Tell whether the ratios are equivalent.

18. $\frac{12}{9}$ and $\frac{24}{18}$

19. 14 : 4 and 21 : 8

20. 8 to 21 and 48 to 126

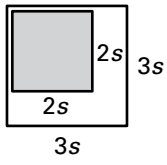
Write the equivalent rate.

21. $\frac{8 \text{ calls}}{1 \text{ hour}} = \frac{? \text{ calls}}{1 \text{ day}}$

22. $\frac{1400 \text{ students}}{40 \text{ teachers}} = \frac{? \text{ students}}{1 \text{ teacher}}$

23. $\frac{12 \text{ km}}{1 \text{ h}} = \frac{? \text{ m}}{1 \text{ min}}$

24. Find the ratio of the area of the shaded square region to the area of the unshaded square region.



25. One box of cereal is 20 ounces and costs $3. A smaller box of the same type of cereal is 12 ounces and costs $2. Which box of cereal is the better buy? Explain.

FOCUS ON **6.1**

Name _____ Date _____

Practice

For use with pages 281–282

Write the equivalent rate.

1. $\frac{\$13}{1\text{ oz}} \approx \frac{?\text{ dollars}}{1\text{ kg}}$
2. $\frac{42\text{ in.}}{1\text{ sec}} \approx \frac{?\text{ cm}}{1\text{ sec}}$
3. $\frac{\$42}{1\text{ oz}} \approx \frac{?\text{ dollars}}{1\text{ g}}$
4. $\frac{\$7}{1\text{ lb}} \approx \frac{?\text{ dollars}}{1\text{ kg}}$
5. $\frac{50\text{ yd}}{1\text{ sec}} \approx \frac{?\text{ m}}{1\text{ sec}}$
6. $\frac{8\text{ cm}}{1\text{ min}} \approx \frac{?\text{ in.}}{1\text{ min}}$
7. $\frac{62\text{ m}}{1\text{ sec}} \approx \frac{?\text{ m}}{1\text{ min}}$
8. $\frac{45\text{ mi}}{1\text{ h}} \approx \frac{?\text{ km}}{1\text{ h}}$
9. $\frac{325\text{ ft}}{1\text{ h}} \approx \frac{?\text{ m}}{1\text{ min}}$
10. $\frac{380\text{ km}}{1\text{ h}} \approx \frac{?\text{ km}}{1\text{ sec}}$
11. $\frac{53\text{ mi}}{1\text{ h}} \approx \frac{?\text{ km}}{1\text{ min}}$
12. $\frac{675\text{ ft}}{1\text{ min}} \approx \frac{?\text{ m}}{1\text{ sec}}$

13. **Gold** The price of gold is $979 per ounce. What is this rate in dollars per gram?

14. **Shower** A showerhead flows water at a rate of 2.5 gallons per minute. What is this rate in liters per second?

15. **Bike Riding** A bike rider travels at a rate of 25 kilometers per hour. About how many miles can the bike rider travel in 25 minutes?

16. **Challenge** Plane A travels at a rate of 780 kilometers per hour. Plane B travels at a rate of 580 miles per hour. Which plane travels faster? After 15 minutes, what is the difference in miles between how far the planes have traveled?

LESSON 6.2

Name _____ Date _____

Practice

For use with pages 283–289

Use equivalent ratios to solve the proportion.

1. $\frac{2}{7} = \frac{24}{x}$

2. $\frac{4}{15} = \frac{x}{90}$

3. $\frac{x}{20} = \frac{154}{280}$

4. $\frac{x}{13} = \frac{70}{91}$

5. $\frac{17}{30} = \frac{x}{120}$

6. $\frac{25}{28} = \frac{375}{x}$

7. $\frac{x}{35} = \frac{96}{210}$

8. $\frac{34}{9} = \frac{x}{162}$

9. $\frac{x}{41} = \frac{165}{205}$

Use algebra to solve the proportion.

10. $\frac{x}{14} = \frac{10}{4}$

11. $\frac{x}{22} = \frac{20}{5}$

12. $\frac{15}{65} = \frac{x}{13}$

13. $\frac{40}{24} = \frac{x}{9}$

14. $\frac{63}{93} = \frac{x}{31}$

15. $\frac{x}{36} = \frac{12}{16}$

16. $\frac{15}{26} = \frac{x}{182}$

17. $\frac{x}{108} = \frac{15}{12}$

18. $\frac{20}{68} = \frac{x}{17}$

19. $\frac{4.5}{20} = \frac{x}{4}$

20. $\frac{x}{16.5} = \frac{84}{132}$

21. $\frac{x}{14} = \frac{11}{35}$

In Exercises 22–25, write and solve a proportion to solve the problem.

22. Four notebooks cost $4.40. How many notebooks can you buy for $6.60?

23. Two roses cost $3.50. How many roses can you buy for $17.50?

24. A roll of paper towels cost $1.90. How many rolls can you buy for $9.50?

25. Carl works 8 hours and earns $52. How many hours would he have to work to earn $130?

26. Use the table below that shows the prices of several fruits to answer the following questions.

Fruit	Price
Apples	4 for $3.00
Bananas	3 lb/$1.50
Cantaloupes	2 for $2.50
Cherries	2 lb/$2.40
Peaches	1 lb/$.90

a. How much would 5 pounds of bananas cost?

b. How much would 7 apples cost?

c. You are making a fruit salad for a party. You want to use 5 apples, 2 pounds of bananas, 1 cantaloupe, 1.5 pounds of cherries, and 2 pounds of peaches. How much will the fruit cost for your fruit salad?

FOCUS ON **6.2**

Name _____ Date _____

Practice

For use with pages 291–292

For each table in Exercises 1–5, (a) determine whether the data represent direct variation or inverse variation, (b) identify the constant of variation and interpret it for the situation, and (c) find the missing value of y.

1. Boating The table gives the amount y of gas needed to travel a fixed distance if a boat gets x miles per gallon when driven at a constant speed.

Mileage (miles per gallon), *x*	11	13.75	15	16.5	27.5	33
Gas (gallons), *y*	7.5	6	5.5	5	3	y

2. Conservation A school is raising money to donate to a rainforest conservation group. The table gives the cost y in dollars to preserve x acres of a rainforest.

Amount (acres), *x*	1	3	5	7	9	14
Cost (dollars), *y*	60	180	300	420	540	y

3. Fundraiser The school band is selling tickets to its annual fundraiser. The table gives the money raised from selling tickets y in terms of x the number of tickets sold.

Number of tickets sold, *x*	18	22	26	30	34	48
Money raised (dollars), *y*	252	308	364	420	476	y

4. Driving The table shows the distance y that a car can be driven at a constant speed using x gallons of gas.

Gas (gallons), *x*	3	7	14	21	28	35
Distance (miles), *y*	y	119	238	357	476	595

5. Catering A company has a budget for its awards dinner and is considering different caterers. For a caterer that charges x dollars per person, the table gives the number y of people who can attend the dinner.

Cost (dollars), *x*	8	10	16	20	40	80
Number of attendees, *y*	80	64	40	32	y	8

6. Challenge A tree farm sells evergreen trees. The table gives the cost y of buying x evergreen trees. Sort this data into two sets, each with a constant of variation. Interpret the constants of variation of this situation. *Explain* why you think the constant of variation changes.

Number of trees, *x*	2	3	4	5	6	7	8	9
Cost (dollars), *y*	72	108	144	162	194.4	226.8	259.2	291.6

LESSON 6.3

Name _____ Date _____

Practice

For use with pages 292–298

Tell whether the ratios form a proportion.

1. $\frac{5}{12}, \frac{60}{144}$ **2.** $\frac{48}{90}, \frac{8}{15}$ **3.** $\frac{52}{16}, \frac{39}{10}$ **4.** $\frac{70}{28}, \frac{20}{8}$

5. $\frac{96}{120}, \frac{60}{85}$ **6.** $\frac{9}{6}, \frac{156}{104}$ **7.** $\frac{36}{48}, \frac{30}{40}$ **8.** $\frac{115}{85}, \frac{161}{136}$

Solve the proportion.

9. $\frac{14}{24} = \frac{21}{x}$ **10.** $\frac{32}{40} = \frac{x}{15}$ **11.** $\frac{9}{102} = \frac{12}{x}$

12. $\frac{28}{x} = \frac{8}{16}$ **13.** $\frac{8.4}{x} = \frac{8}{20}$ **14.** $\frac{14.6}{23} = \frac{x}{11.5}$

15. $\frac{18.3}{x} = \frac{6.1}{10}$ **16.** $\frac{40}{320} = \frac{14}{x}$ **17.** $\frac{12}{x} = \frac{0.4}{9}$

18. $\frac{3.5}{x} = \frac{49}{56}$ **19.** $\frac{0.2}{2.35} = \frac{4}{x}$ **20.** $\frac{6.02}{4} = \frac{x}{40}$

Find the value of *x*.

21. $\frac{30}{48} = \frac{15}{x+9}$ **22.** $\frac{51}{x+11} = \frac{15}{5}$ **23.** $\frac{x-4}{42} = \frac{14}{84}$

24. $\frac{35}{20} = \frac{13-x}{28}$ **25.** $\frac{18}{50} = \frac{3x}{175}$ **26.** $\frac{22}{38} = \frac{33}{2x+7}$

27. In a batch of 120 manufactured machine parts, 3 are found to be defective. At this rate, how many machine parts would be defective in a batch of 12,000?

28. A post office sells first-class stamps and postcard stamps. For the year, the post office sold 7 first-class stamps for every 2 postcard stamps sold.

a. The post office sold 46,260 stamps for the year. How many of them were first-class stamps? How many were postcard stamps?

b. First-class stamps sold for $.44 each. Postcard stamps sold for $.28 each. Write a ratio for the amount of money collected for first-class stamps to the amount of money collected for postcard stamps.

c. Is the ratio you wrote in part (b) proportional to the ratio of first-class stamps sold to postcard stamps sold?

LESSON **6.4**

Name _____ Date _____

Practice

For use with pages 299–304

Given *EFGH* ~ *JKLM*, tell whether the statement is *true* or *false*.

1. $\angle F$ and $\angle J$ are corresponding angles.

2. $\overline{GH}$ and $\overline{LM}$ are corresponding sides.

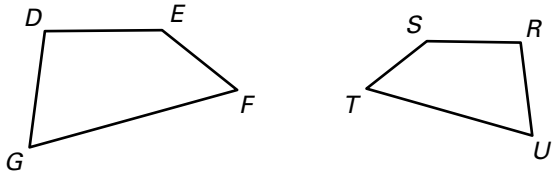
3. $\angle H$ and $\angle M$ are corresponding angles.

4. $\overline{HE}$ and $\overline{MJ}$ are corresponding sides.

5. $\overline{FG}$ and $\overline{KL}$ are corresponding sides.

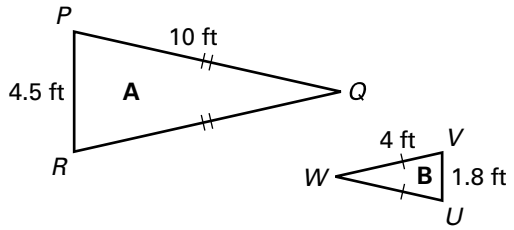
6. $\angle G$ and $\angle K$ are corresponding angles.

7. Given $DEFG \sim RSTU$, name the corresponding angles and the corresponding sides.



The figures are similar. Find the ratio of the lengths of the corresponding sides of figure A to figure B.

8.



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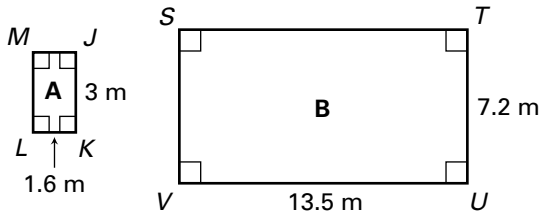

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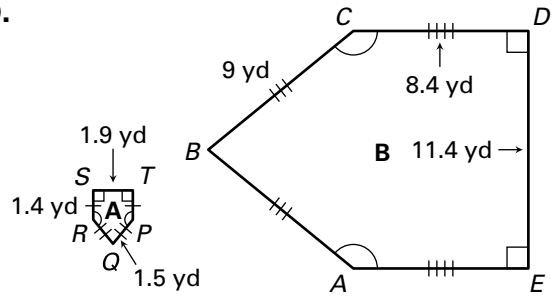
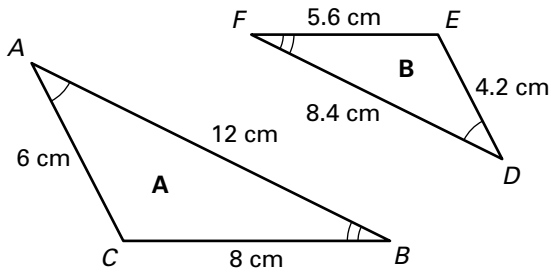
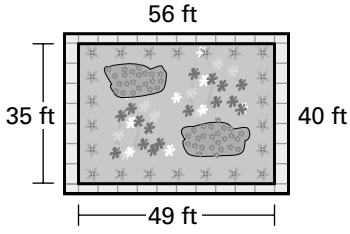


11.



12. A rectangular garden is 49 feet long and 35 feet wide. The garden is bordered by a rectangular walkway that is 56 feet long and 40 feet wide as shown in the figure.



a. Is the garden area similar to the rectangle formed by the bordering walkway? If so, find the ratio of the lengths of the corresponding sides of the garden to the walkway.

b. Find the ratio of the perimeter of the garden to the perimeter of the walkway. How is it related to the ratio in part (a)?

c. Find the ratio of the area of the garden to the area of the garden including the walkway.

LESSON 6.5

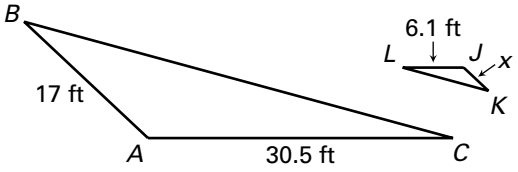
Name _____ Date _____

Practice

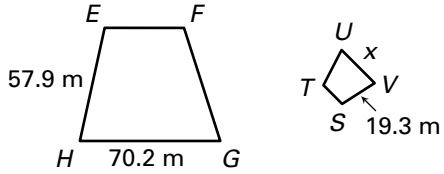
For use with pages 305–309

Find the specified side length.

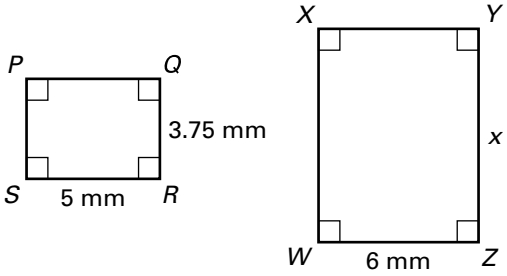
1. Given $\triangle ABC \sim \triangle JKL$, find JK.



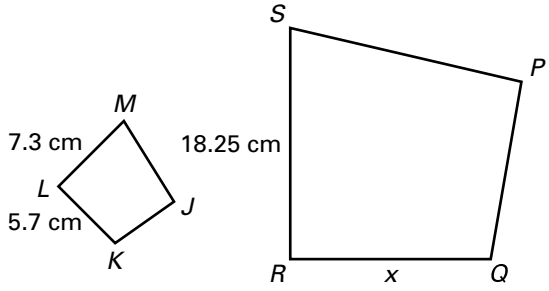
2. Given $EFGH \sim STUV$, find UV.



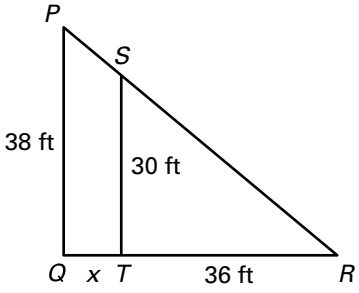
3. Given $PQRS \sim WXYZ$, find YZ.



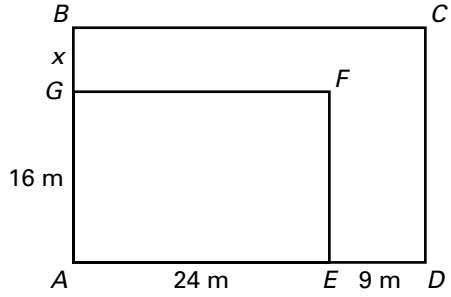
4. Given $JKLM \sim PQRS$, find QR.



5. Given $\triangle PQR \sim \triangle STR$, find QT.



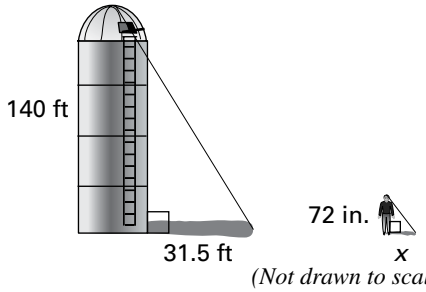
6. Given $ABCD \sim AGFE$, find GB.



7. The ratio of a side length of rectangle A to a corresponding side length of rectangle B is 12 : 5. Rectangle A has a side length of 60 inches. Find the corresponding side length of rectangle B.

8. The ratio of a side length of triangle A to a corresponding side length of triangle B is 5 : 8. Triangle A has a side length of 18 centimeters. Find the corresponding side length of triangle B.

9. A farmer who is 72 inches tall is standing beside a silo that has a height of 140 feet. The length of the silo's shadow is 31.5 feet. What is the length of the farmer's shadow?



(Not drawn to scale)

LESSON 6.6

Name _____ Date _____

Practice

For use with pages 311–316

A map has a scale of 1 inch : 12 miles. Use the given map distance to find the actual distance.

1. 8 inches

2. 17 inches

3. 25 inches

4. 42 inches

5. $\frac{1}{2}$ inch

6. $\frac{3}{4}$ inch

7. $\frac{3}{8}$ inch

8. $1\frac{1}{8}$ inches

9. $2\frac{1}{2}$ inches

A map has a scale of 1 centimeter : 6 kilometers. Use the given actual distance to find the distance on the map.

10. 24 kilometers

11. 54 kilometers

12. 90 kilometers

13. 33 kilometers

14. 1.8 kilometers

15. 3.6 kilometers

16. 7.2 kilometers

17. 1.5 kilometers

18. 2.7 kilometers

Write the scale without units.

19. 1 in. : 14 ft

20. 1 in. : 30 yd

21. 1 cm : 3 m

22. 1 cm : 65 m

23. 1 cm : 8 km

24. 1 mm : 32 cm

25. On a map, the distance between two cities is $4\frac{1}{2}$ inches. What is the actual distance in miles between the two cities if the map's scale is 1 inch : 80 miles?

26. In a scale drawing, a wall is $1\frac{1}{2}$ inches long. The actual wall is 12 feet long. Find the scale of the drawing.

27. A model of the Transamerica Pyramid in San Francisco, California has a scale of 1 : 130. The height of the Transamerica Pyramid is 260 meters. Find the height of the model.

28. A scale model of a football stadium has a scale of 1 : 360.

a. The actual length of the football field including the end zones is 120 yards. How long in inches is the football field in the model?

b. How many times the length of the model is the length of the actual stadium?

LESSON 6.7

Name _____ Date _____

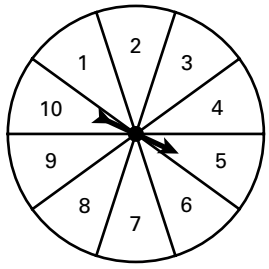
Practice

For use with pages 317–324

Complete the statement.

1. A(n) __?__ probability is based on knowing all of the equally likely outcomes of an experiment.
2. A(n) __?__ probability is based on repeated trials of an experiment.

Use the spinner to find the probability. The spinner is divided into equal parts.

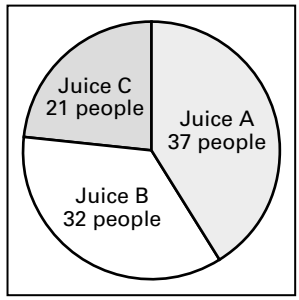


3. What is the probability that the spinner stops on a multiple of 3?
4. What is the probability that the spinner stops on a multiple of 4?
5. What are the odds against stopping on a number greater than 8?
6. What are the odds in favor of stopping on a number less than 5?
7. If you spin the spinner 50 times, how many times do you expect it to stop on 10?

Each letter in the word SUCCESSES is written on separate slips of paper and placed in a bag. A letter is chosen at random from the bag.

8. What is the probability that the letter chosen is an S?
9. What is the probability that the letter chosen is a vowel?
10. What are the odds against choosing a consonant?
11. A weather forecast says that there is a 40% chance of rain today. Find the odds against rain.
12. You plant 48 seeds of a certain flower and 32 of them sprout. Find the experimental probability that the next flower seed planted will sprout.

The circle graph shows which juice blend people chose as their favorite in a taste test.



13. What is the probability that a person chosen at random chose Juice B?
14. What are the odds in favor of choosing a person at random who chose Juice A?

FOCUS ON **6.7**

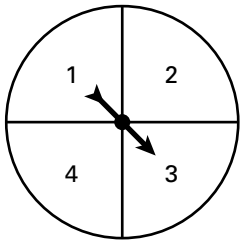
Name _____ Date _____

Practice

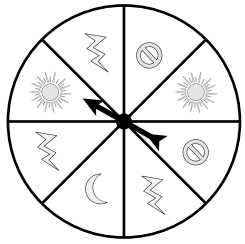
For use with pages 325–326

Determine whether the game is fair.

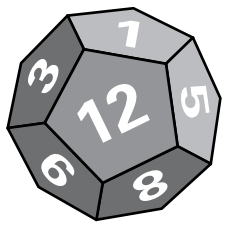
1. Two teams flip a coin to see who gets to bat first in a baseball game. If the coin lands on heads, team 1 bats first. If the coin lands on tails, team 2 bats first.
2. Two players roll a number cube. Player 1 scores a point if the number cube shows a factor of 10. Player 2 scores a point if the number cube shows a factor of 8. The player who scores 10 points first wins.
3. Each letter in the words PIZZA and PAJAMA is written on separate cards and placed in a hat. Two players draw cards from the hat and return the cards after they are drawn. Player 1 scores a point for every consonant drawn. Player 2 scores a point for every vowel drawn. The player who scores 4 points first wins.
4. Two players each roll a number cube. If a player rolls a 1, that player scores the number of points the other player rolls. No points are awarded unless a 1 is rolled. The player who scores 10 points first wins.
5. A box contains 8 straws that are 2 different lengths: 4 straws are short and 4 are long. Two players take turns drawing straws from the box until the box is empty. The player who draws the greatest number of long straws wins.
6. Two players spin the spinner shown, which is divided into equal parts. If player 1 spins a prime number, the player scores that number of points, but otherwise the player scores no points. If player 2 spins an even number, the player scores that number of points, but otherwise scores no points. The player who scores 10 points first wins.



7. **Rock Band** Two friends designed the spinner game shown to decide on the design for their rock band's T-shirts. One friend scores a point if the spinner lands on the lightning bolt or sun. The other friend scores a point if the spinner lands anywhere else. The friend who scores 3 points first wins. Determine whether this game is fair. *Explain* your answer.



8. **Challenge** Two players in a game roll 12-sided number prisms like the one shown. If player 1 rolls a number less than 6, the player scores the number of points rolled by player 2, but otherwise scores no points. If player 2 rolls a number greater than 6, the player scores the number of points rolled by player 1, but otherwise scores no points. The player with the most points wins the round. Determine whether the game is fair. *Explain* your answer.



LESSON 6.8

Name _____ Date _____

Practice

For use with pages 327–331

In Exercises 1–4, make a tree diagram to find all the possible choices. Check your answer using the multiplication principle.

1. Choose turkey, roast beef, or ham with white, whole wheat, or rye bread.

2. Choose a sedan, truck, SUV, or minivan in red, blue, black, or green.

3. Choose a T-shirt, a button-down shirt, or a sweater, jeans or khakis, and either a red coat or a blue coat.

4. Choose a ranch, two-story, or tri-level house, white or gray siding, and either a one-car or two-car garage.

5. A menu has 3 choices for salad, 5 main dishes, and 4 desserts. How many different meals are possible if you select a salad, a main dish, and a dessert?

6. You are planning a trip. You can go to Phoenix, Las Vegas, San Diego, or Los Angeles, you can fly or drive, and you can stay for 3, 4, or 5 days. How many possible trips are there?

7. The telephone extensions at a company use 4 digits.

a. How many extensions are possible if there are no restrictions?

b. How many extensions are possible if the first digit cannot be 0 or 9?

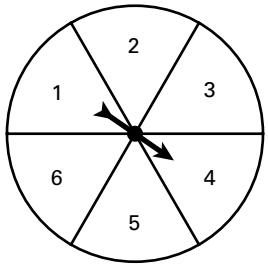
c. How many extensions are possible if the first digit can only be 1?

8. You are choosing a computer password. The password has 3 letters followed by 3 digits.

a. How many passwords are possible if the letters must be uppercase?

b. How many passwords are possible if no letter or digit can be repeated and the letters have to be lowercase?

In Exercises 9 and 10, use the following information. You have a 6-sided number cube and the spinner shown. The spinner is divided into equal parts.



9. You spin the spinner two times. Find the probability that the spinner stops on 3, then 1.

10. You spin the spinner once and roll the number cube once. Find the probability that the spinner stops on the same number that you roll with the number cube.

11. You flip a coin 5 times. What is the probability that the results are all heads or all tails?

12. Each person that works at a company is given a 5-digit code followed by a letter, either uppercase or lowercase. These employees must enter their codes on a keypad to enter and exit the office building. The company has 130 employees.

a. How many codes are possible if there are no restrictions?

b. What is the probability of someone entering a code at random and gaining entry to the building?

FOCUS ON **6.8**

Name _____ Date _____

Practice

For use with pages 332–333

Determine the number of ways that the specified event can occur when two number cubes are rolled.

1. Getting a sum of 5 or 6
2. Getting a sum of 10 or 11
3. Getting a sum of 2 or 4
4. Getting a sum less than 4
5. Getting a sum greater than 8
6. Getting a sum that is even

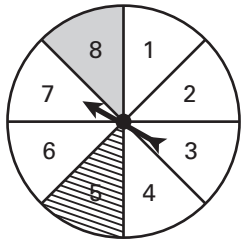
Tell whether you would use the addition principle or the multiplication principle to determine the total number of possible outcomes for the situation described.

7. Getting a sum less than 10 after rolling four number cubes
8. Rolling four number cubes

A set of playing cards contains four groups of cards designated by color (red, orange, blue, and pink) with cards numbered from 2 to 10 in each group. Determine the number of ways that the specified event can occur when a card is drawn from the set.

9. Drawing a red or blue card
10. Drawing a 4 or 5
11. Drawing a number greater than 7
12. Drawing an orange, pink, or blue card

The spinner is divided into equal parts. Find the specified probability.



13. P (landing on an even number or on striped)
14. P (landing on an odd number or on white)
15. P (landing on a prime number or on a number greater than 6)
16. P (landing on a number less than 3, on white, or on gray)
17. **Challenge** You roll three number cubes. How many possible outcomes are there? What is the probability that you roll a sum less than or equal to 5?

LESSON 7.1

Name _____ Date _____

Practice

For use with pages 345–349

Write the percent as a fraction.

1. 9%

2. 24%

3. 53%

4. 91%

5. 88%

6. 76%

7. 60%

8. 44%

9. 32%

Write the fraction as a percent.

10. $\frac{49}{50}$

11. $\frac{9}{25}$

12. $\frac{1}{5}$

13. $\frac{103}{200}$

14. $\frac{7}{20}$

15. $\frac{93}{100}$

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

17. $\frac{11}{50}$

18. $\frac{2}{25}$

You spin the spinner shown. Find the probability of the given event. Write your answer as a percent.

19. *P*(odd)

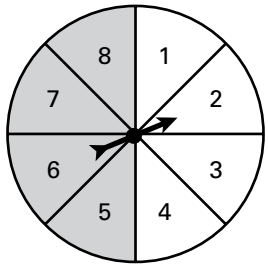
20. *P*(even)

21. *P*(multiple of 2)

22. *P*(multiple of 3)

23. *P*(greater than 2)

24. *P*(shaded)



Find the percent of the number.

25. 60% of 145

26. 90% of 120

27. 32% of 75

28. 56% of 50

29. 64% of 125

30. 12% of 150

31. The table shows the results of a class survey that asked 600 students what their favorite outdoor activity is.

a. Estimate how many students chose either walking or jogging.

b. Estimate how many more students chose in-line skating than biking.

c. The class surveyed 100 other students and found that 23% chose in-line skating as their favorite. Estimate how many students in both surveys combined chose in-line skating as their favorite.

Outdoor activity	Percent
In-line skating	35%
Biking	25%
Jogging	15%
Walking	10%
Other	15%

LESSON 7.2

Name _____ Date _____

Practice

For use with pages 350–355

Use a proportion to answer the question.

1. What percent of 70 is 21?

2. What percent of 48 is 12?

3. What percent of 56 is 42?

4. What percent of 105 is 63?

5. What number is 42% of 150?

6. What number is 70% of 130?

7. What number is 48% of 175?

8. What number is 15% of 160?

9. 150 is 15% of what number?

10. 21 is 12% of what number?

11. 198 is 33% of what number?

12. 264 is 55% of what number?

13. The population of a town in 2004 was 12,000. The population of the town in 1994 was 10,800. What percent of the 2004 population is the 1994 population?

14. The Royal Opera House Orchestra in London, England, includes 13 musicians who play the viola. The musicians in the viola section make up $12\frac{1}{2}\%$ of the orchestra. How many musicians are in the Royal Opera House Orchestra?

15. A bag contains 6 red marbles, 9 blue marbles, and 5 green marbles. You randomly select one marble from the bag. What is the probability that the marble is red? Write your answer as a percent.

16. A greeting card store receives a shipment of cards. The table shows the number of each type of card received.

Type of card	Number of cards
Birthday	72
Good Luck	36
Friendship	92
Get Well	40

a. What percent of the cards were birthday cards? Good luck cards?

b. In the shipment, 40% of the cards had yellow envelopes. Of the 72 birthday cards, 18 had yellow envelopes. What percent of the birthday cards had yellow envelopes?

Use a proportion to answer the question in terms of *y*.

17. What number is 16% of y?

18. What percent of $6y$ is 24?

19. $3y$ is 45% of what number?

20. What percent of $7y$ is 119?

LESSON 7.3

Name _____ Date _____

Practice

For use with pages 356–360

Write the decimal as a percent.

1. 0.41 **2.** 0.93 **3.** 0.01

4. 3 **5.** 0.0079 **6.** 0.061

Write the percent as a decimal.

7. 5% **8.** 23% **9.** 89%

10. 246% **11.** 105.8% **12.** 0.073%

13. You are reading a book that has 560 pages. You have read about $\frac{11}{20}$ of the book. What percent of the book have you read?

Write the fraction as a percent.

14. $\frac{19}{30}$ **15.** $\frac{8}{15}$ **16.** $\frac{27}{40}$

17. $\frac{15}{9}$ **18.** $\frac{17}{8}$ **19.** $\frac{13}{6}$

Find the percent of the number.

20. 45% of 18 **21.** 32% of 110 **22.** 102% of 150

23. 205% of 40 **24.** 0.25% of 300 **25.** 0.361% of 500

26. In 2002, the world population was about 6,234,250,000. In 2002, the population of Europe was about 11.6% of the world's total population. About how many people lived in Europe in 2002?

27. A bag contains a total of 25 marbles. The bag contains white, yellow, and red marbles. You randomly select one marble from the bag. The probability that you select a red marble is 16%. How many red marbles are in the bag?

Use a number line to order the numbers from least to greatest.

28. 248%, 2.56, $\frac{49}{20}$, 2.51, $\frac{127}{50}$

29. 0.0041, $\frac{19}{5000}$, 0.45%, $\frac{7}{2000}$, 0.042

30. 170%, $\frac{41}{25}$, 2, 168%, $\frac{89}{50}$

31. 0.0093, $\frac{6}{625}$, 0.094, 0.91%, $\frac{19}{2000}$

Evaluate the expression when $m = 25$.

32. m% of 70 **33.** 3% of m **34.** 130% of m

LESSON 7.4

Name _____ Date _____

Practice

For use with pages 361–365

1. Describe and correct the error in using the percent equation to find what percent of 125 is 82.

$$a = p\% \cdot b$$
$$82 = p\% \cdot 125$$
$$\frac{82}{125} = p\%$$
$$0.656\% = p\%$$

Use the percent equation to answer the question.

2. What number is 92% of 115?

3. What number is 35% of 80?

4. What number is 21% of 60?

5. What number is 6% of 25?

6. What percent of 70 is 42?

7. What percent of 325 is 78?

8. What percent of 152 is 95?

9. What percent of 315 is 126?

10. 88 is 32% of what number?

11. 49 is 35% of what number?

12. 124 is 80% of what number?

13. 82 is 4% of what number?

14. A car salesperson earns 1.5% commission on every car sold. The salesperson sells a car for $22,500. What is the commission?

15. At the concession stand of a school football game, sandwiches cost $1.50 and a bottle of water costs $.90. The school sells 40 sandwiches and 80 bottles of water.

a. How much money was made from selling sandwiches? Bottles of water?

b. What percent of the money came from sales of sandwiches?

c. What percent of the concessions sold was bottles of water?

16. Due to a membership drive for a public television station, the current membership is 125% of what it was a year ago. The current membership is 1200. How many members did the station have last year?

17. Randal answers 96 out of 120 questions correctly on a science exam. What percent of the questions did Randal answer correctly?

Use the percent equation to answer the question when $n = 55$.

18. What is $(n - 5)\%$ of 150?

19. What percent of 900 is $(n + 20)$?

20. $(3n)$ is 20% of what number?

21. What is $(2n)\%$ of 540?

LESSON 7.5

Name _____ Date _____

Practice

For use with pages 367–372

Find the percent of increase or decrease.

1. Original: 400
New: 552

2. Original: 800
New: 1216

3. Original: 1100
New: 1969

4. Original: 1700
New: 3094

5. Original: 475
New: 589

6. Original: 175
New: 259

7. Original: 600
New: 174

8. Original: 240
New: 156

9. Original: 4500
New: 4005

10. Original: 900
New: 324

11. Original: 650
New: 91

12. Original: 1460
New: 657

Find the new amount.

13. Increase 300 by 54%.

14. Increase 2850 by 18%.

15. Increase 1425 by 4%.

16. Decrease 280 by 95%.

17. Decrease 225 by 68%.

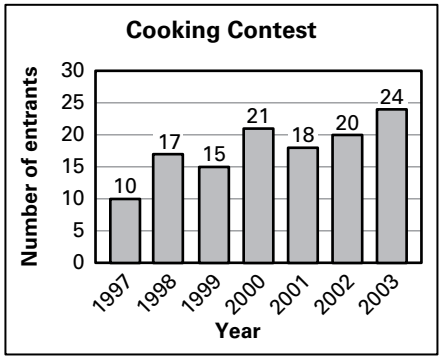
18. Decrease 700 by 49%.

19. Last year, 12,500 people participated in a charity 10K walk. This year, 14,000 people participated in the walk. By what percent did the number of participants change from last year to this year?

20. In 1991, sporting good stores sold about $15 billion in merchandise. In 2001, sporting good stores sold about $28 billion in merchandise. Find the percent of change from 1991 to 2001.

21. An antique ceramic pitcher is being sold at an online auction. The minimum bid is $125. At the end of the auction, the pitcher is sold for 288% above the minimum bid. What is the selling price of the pitcher?

22. The bar graph shows the number of entrants in an annual cooking contest from 1997 through 2003.



a. Find the percent of change from 1997 to 1999.

b. Find the percent of change from 1999 to 2003.

c. Find the percent of change from 1997 to 2003.

LESSON 7.6

Name _____ Date _____

Practice

For use with pages 373–377

In Exercises 1–6, use the given information to find the new price.

1. Wholesale price: $5
Markup percent: 125%

2. Wholesale price: $92
Markup percent: 45%

3. Wholesale price: $210
Markup percent: 30%

4. Original price: $33
Discount percent: 20%

5. Original price: $76
Discount percent: 35%

6. Original price: $106
Discount percent: 70%

7. A video game is on sale for 15% off the retail price of $45. A store is having a sale on all video games, providing an additional 20% off of all sale prices. What is the new sale price of the video game?

In Exercises 8–15, use the given information to find the total cost.

8. Original price: $16
Sales tax: 6%

9. Original price: $28
Sales tax: 4.5%

10. Original price: $49
Sales tax: 7%

11. Original price: $82
Sales tax: 5.5%

12. Food bill: $55
Sales tax: 8%
Tip: 18%

13. Food bill: $68
Sales tax: 3%
Tip: 20%

14. Food bill: $80.40
Sales tax: 5%
Tip: 10%

15. Food bill: $30
Sales tax: 5.5%
Tip: 15%

16. A shoe store is having a sale on sneakers. You want to buy a pair of sneakers that originally cost $75. The sales tax is 4% and it will be applied to the sale price of the sneakers. What is the total cost of the sneakers?

17. The food bill for your breakfast is $16.85. You leave a 10% tip. The sales tax is 5%. What is the total cost, to the nearest cent, of your meal?

In Exercises 18–21, use the given information to find the original price.

18. Retail price: $99
Markup percent: 80%

19. Retail price: $67.60
Markup percent: 150%

20. Sale price: $32.45
Discount percent: 45%

21. Sale price: $48.79
Discount percent: 15%

LESSON 7.7

Name _____ Date _____

Practice

For use with pages 378–383

For an account that earns simple annual interest, find the interest and the balance of the account. Round your answer to the nearest cent, if necessary.

1. $P = \$100$, $r = 3.5\%$, $t = 5$ years

2. $P = \$525$, $r = 6\%$, $t = 9$ years

3. $P = \$400$, $r = 4\%$, $t = 12$ years

4. $P = \$1100$, $r = 2\%$, $t = 15$ years

5. $P = \$900$, $r = 5\%$, $t = 45$ months

6. $P = \$1050$, $r = 3.1\%$, $t = 27$ months

Find the unknown quantity for an account that earns simple annual interest.

7. $A = \$875$, $P = \$500$, $r =$ __?__, $t = 30$ years

8. $A = \$1128.50$, $P = \$925$, $r = 5.5\%$, $t =$ __?__

9. $A = \$1213.60$, $P = \$800$, $r = 4.7\%$, $t =$ __?__

10. $A = \$2719.50$, $P =$ __?__, $r = 6.1\%$, $t = 20$ years

11. A \$700 bond earns 3.5% simple annual interest. What is the interest earned after 21 years?

12. Kendall loans Reagan \$500 and charges her 2% simple annual interest. Reagan promises to repay Kendall in 14 months. About how much will Reagan have to pay Kendall? Round your answer to the nearest cent.

13. The table shows three accounts that earn simple annual interest. Complete the table by finding the unknown quantity.

Balance	Principal	Interest rate	Time
\$1286.25	?	7.5%	3 years
\$2610.85	\$2020	9%	?
\$3742.50	\$3000	?	45 months

14. You deposit \$250 into an account that earns 7.2% simple annual interest. After how many years will the account have a balance of \$700?

For an account that earns interest compounded annually, use a calculator to find the balance of the account. Round your answer to the nearest cent.

15. $P = \$900$, $r = 5\%$, $t = 3$ years

16. $P = \$4000$, $r = 8.2\%$, $t = 10$ years

17. $P = \$600$, $r = 9.3\%$, $t = 2$ years

18. $P = \$2000$, $r = 7.5\%$, $t = 20$ years

19. You deposit \$575 into a savings account that earns 4.6% interest compounded annually. Use a calculator to find the new balance of the account after 4 years. Round your answer to the nearest cent.

20. The accounts shown earn interest compounded annually. Which account will have the greater balance in the given time?

Account A	Account B
Principal: \$405	Principal: \$405
Interest rate: 7.2%	Interest rate: 5.3%
Time: 15 years	Time: 30 years

LESSON **8.1**

Name _____ Date _____

Practice

For use with pages 401–406

Identify the domain and range of the relation.

1. (5, 0), (6, 0), (7, 6), (8, 8), (8, 10)

2. (−6, 4), (−3, 0), (4, 2), (4, 3), (7, 9)

3.

x	−4	−4	−1	3	4
y	−5	−4	−3	2	0

4.

x	0	0	2	4	8
y	−3	−1	1	3	−1

Represent the relation as a graph and as a mapping diagram. Then tell whether the relation is a function. Explain your reasoning.

5. (−2, 2), (−1, 2), (1, 2), (2, 2)

6. (0, 0), (1, 1), (1, 2), (3, 3), (4, 4)

7.

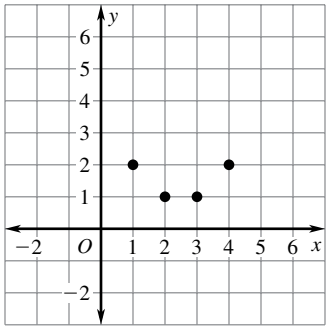
x	−2	−1	0	1	2
y	1	2	2	1	0

8.

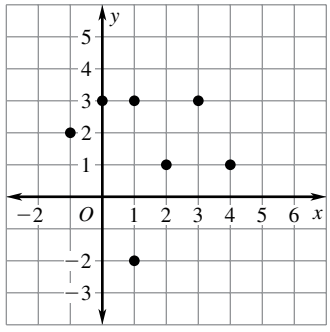
x	2	4	1	2	5
y	3	1	3	2	4

In Exercises 9–11, tell whether the relation represented by the graph is a function.

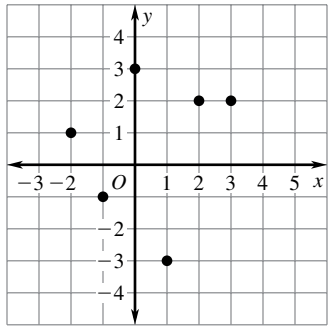
9.



10.



11.



12. Twenty children line up to ride go-carts. The go-cart operator collects $2 from each child in order from the 1st to the 20th in the line. Do the ordered pairs (child number, amount paid) represent a function? Explain your reasoning.

13. The table shows the number of stories and height of five buildings in the United States.

Building	Number of stories, x	Height (in feet), y
Bank of America Plaza	55	1023
Empire State Building	102	1250
Library Tower	75	1018
Sears Tower	110	1450
JP Morgan Chase Tower	75	1002

a. Identify the domain and range of the relation given by the ordered pairs (x, y).

b. Draw a mapping diagram for the relation.

c. Is the relation a function? Explain.

LESSON 8.2

Name _____ Date _____

Practice

For use with pages 407–412

Tell whether the ordered pair is a solution of the equation.

1. $y = 5x$; $(15, -3)$

2. $y = 4x + 9$; $(-2, 1)$

3. $4x - 5y = 1$; $(4, 3)$

4. $7y - 3x = 11$; $(5, 8)$

Find the value of *d* when *r* has the given value in the equation.

5. $d = 2.5r$; $r = 64$

6. $d = 3r + 120$; $r = 62$

7. $d - 5r = 40$; $r = 4$

8. $12r - d = -240$; $r = 9$

Graph the equation. Tell whether the equation is a function.

9. $y = x - 3$

10. $y = 2x + 4$

11. $y = -\frac{3}{4}x$

12. $y = -\frac{1}{3}x + 2$

13. $x = -11$

14. $y = 8$

15. $x = 8$

16. $y = -1$

17. $y = 2(x + 1)$

Write the equation in function form. Then graph the equation.

18. $7x - y = 0$

19. $15x + y = 20$

20. $y + 6x - 12 = 0$

21. $6y - 3x = 12$

22. $3x - 2y = 6$

23. $4x - 12y + 24 = 0$

24. The formula $y = 2.205x$ converts a mass x in kilograms to a weight y in pounds. A sports car has a mass of 1270 kilograms. What is its weight in pounds?

25. A high school booster club sets up an academic scholarship that is awarded to one student each year. The formula $y = 2700x$ can be used to find the total amount y of money awarded through this scholarship after x years. What is the total amount of scholarship money paid after 12 years?

Find the value of *a* that makes the ordered pair a solution of the equation.

26. $y = 3x + 7$; $(-3, a)$

27. $y = 11 - 7x$; $(a, -10)$

28. $2x + 4y = 14$; $(-5, a)$

29. $9x - 5y = -9$; $(a - 1, 9)$

FOCUS ON **8.2**

Name _____ Date _____

Practice

For use with pages 412A–412B

Graph the linear function. Is the function increasing or decreasing? Explain.

1. $y = -3x$

2. $y = -\frac{5}{2}x + 1$

3. $y = \frac{1}{3}x + 4$

4. $y = 2x - 6$

5. $4x - y = 2$

6. $2x + 3y = 12$

7. $x - 2y = -5$

8. $3x + 2y = -9$

Graph the nonlinear function. Is the function increasing or decreasing? Explain.

9. $y = x^3 + 1$

10. $y = 6 - 3x^3$

11. $y = 2x^3 - 5$

12. $y = \frac{1}{3}x^3 + 2$

13. **Area** A triangle has a height that is 4 times its base b. Graph the area A of the triangle as a function of its base b. Is the function linear or nonlinear? increasing or decreasing? Explain.

14. **Sales** For one day, a salesperson makes a base rate of $100 plus a 20% commission on everything she sells. Graph the salesperson's earnings y as a function of her sales x. Is the function linear or nonlinear? increasing or decreasing? Explain.

LESSON 8.3

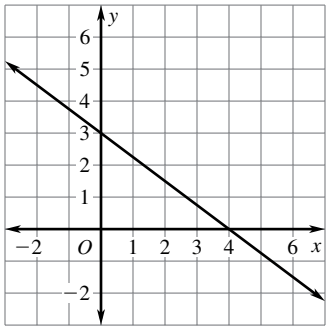
Name _____ Date _____

Practice

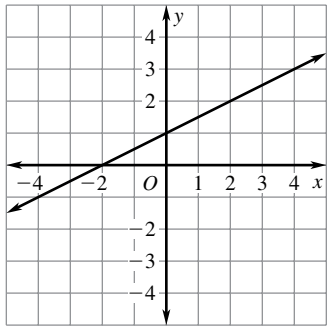
For use with pages 414–418

Identify the *x*-intercept and the *y*-intercept of the line.

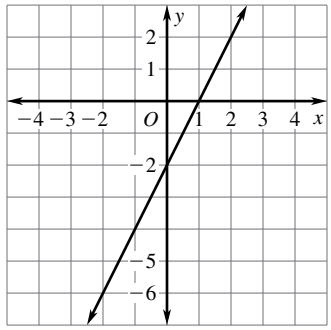
1.



2.



3.



Find the intercepts of the equation's graph. Then graph the equation.

4. $-x + 3y = -9$

5. $2x + 5y = -20$

6. $-3x + 4y = 36$

7. $6x + 7y = 42$

8. $4x + 5y = -60$

9. $2x + y = 14$

10. $-\frac{1}{3}x + \frac{7}{6}y = -\frac{7}{3}$

11. $-\frac{3}{5}x + \frac{1}{5}y = \frac{9}{5}$

12. $\frac{3}{8}x + \frac{1}{2}y = -3$

13. $-21.9x + 6.57y = 65.7$

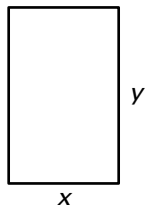
14. $-8.5x + 13.6y = -68$

15. $-6.5x + 1.3y = 3.25$

16. You are in charge of buying salads for a picnic. You have \$20 and plan to buy potato salad and pasta salad. Potato salad costs \$1.25 per pound, and pasta salad costs \$2.50 per pound. Write an equation describing the possible amounts of potato salad and pasta salad that you can buy. Use intercepts to graph the equation.

17. A car rental agency rents economy and luxury cars by the day. The number of economy cars y rented in one day is given by the equation $y = 24 - 4x$, where x is the number of luxury cars rented. Find the x-intercept and the y-intercept of the given equation's graph. Use the intercepts to graph the equation. How many economy cars are rented when 4 luxury cars have been rented?

18. The rectangle shown has a perimeter of 52 inches.



a. Write an equation describing the possible values of x and y.

b. Use intercepts to graph the equation from part (a).

c. Give three pairs of whole-number values of x and y that could represent side lengths of the rectangle.

LESSON 8.4

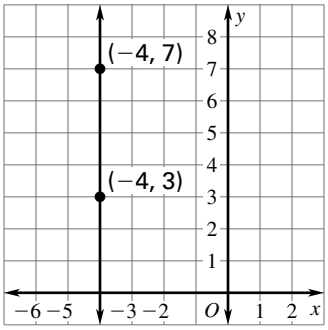
Name _____ Date _____

Practice

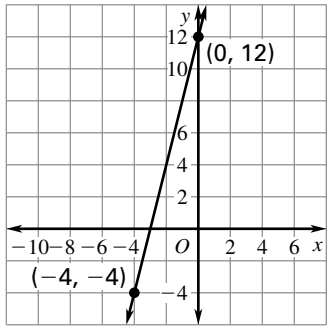
For use with pages 420–425

Tell whether the slope of the line is *positive*, *negative*, *zero*, or *undefined*. Then find the slope.

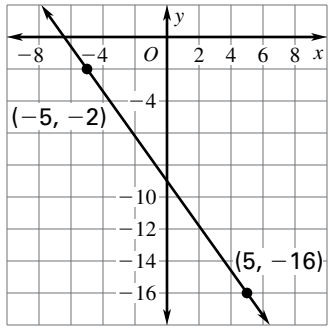
1.



2.



3.



Find the coordinates of two points on the line with the given equation. Then use the points to find the slope of the line.

4. $y = -3x + 11$

5. $y = -17$

6. $y = \frac{7}{8}x - 11$

7. $9x + 8y = 56$

8. $x = 10$

9. $7y - 3x = -147$

Find the slope of the line through the given points.

10. (6, 3), (14, 19)

11. (10, 11), (15, 16)

12. (8, 48), (16, 24)

13. (1, 5), (36, 19)

14. (4, 4), (32, 18)

15. (9, 4), (32, 17)

16. (−6, −17), (−22, −12)

17. (−9, −7), (−11, −13)

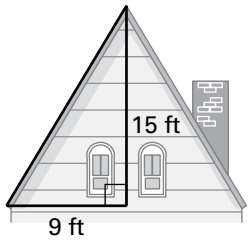
18. (7, −20), (−13, 10)

19. (2, −11), (−13, 14)

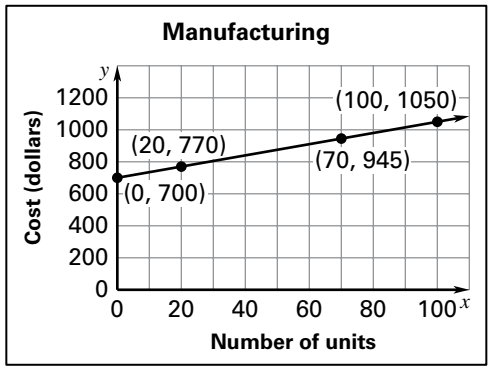
20. (−4, 15), (−9, 11)

21. (4, 4), (14, 10)

22. The slope of the roof of a house is called the pitch of the roof. Find the pitch of the roof shown.



23. A manufacturing company spent $700 on equipment and then a fixed amount per unit. The graph shows the cost to make x units at the manufacturing company.



a. Find the slope of the line.

b. What information about the company can you obtain from the slope?

c. A second manufacturing company spent $700 on equipment and $2.50 per unit. Suppose you made a graph showing the cost to make x units at the second manufacturing company. How would the graph of the second company compare with the graph of the first company? Explain your thinking.

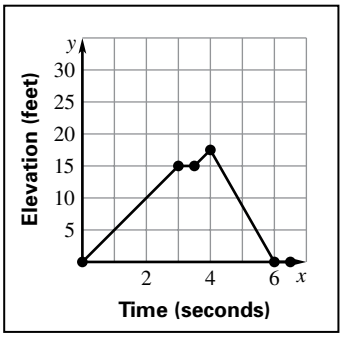
FOCUS ON **8.4**

Name _____ Date _____

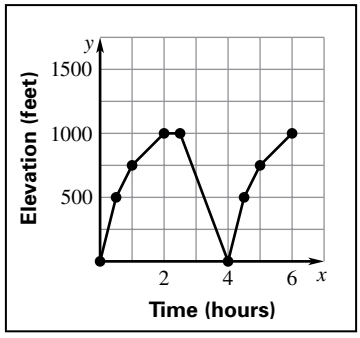
Practice

For use with pages 426–427

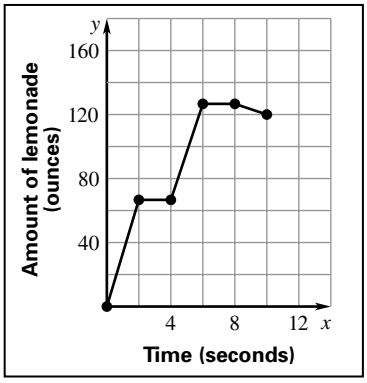
1. Skateboard Jumping The graph shows the elevation of a skateboarder when going off a jump. Describe the skateboarder's movements.



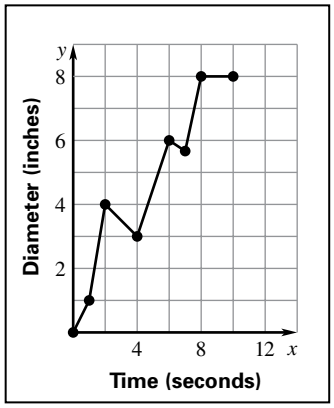
2. Hiking The graph shows the elevation of a hiker when climbing a mountain. Describe the hiker's movements.



3. Lemonade The graph shows the amount of lemonade in a pitcher with capacity of 140 ounces. Describe what is happening.



4. Balloon The graph shows the diameter of a balloon. Describe what is happening.



5. Walking Two soccer players walk 1.5 miles from home to get to practice. The soccer players walk 0.5 miles before realizing they are late for practice. To get there on time, they run the rest of the way. After staying at soccer practice for 1 hour, they walk home. Draw a graph to represent this situation.

6. Commuting An attorney commutes to work by driving 5 miles to the train station, traveling 60 miles by train, and then walking 1 mile to the office. Draw a graph to represent this situation.

7. Challenge A meteorologist records the temperature once every hour. The table shows the meteorologist's data.

a. Graph the data and connect the consecutive points with line segments. Use the slope to describe how the temperature is changing.

b. Predict the temperature when $x = 18$.

Time (hours since 7 A.M.), *x*	0	2	4	6	8	10	12	14
Temperature (degrees Fahrenheit), *y*	38	44	54	56	56	48	46	40

LESSON 8.5

Name _____ Date _____

Practice

For use with pages 430–435

Identify the slope and *y*-intercept of the line with the given equation.

1. $y = -\frac{1}{3}x + 6$

2. $y = \frac{3}{4}x$

3. $y - 4x = -8$

4. $3x - y = 12$

5. $2x + 6y = 12$

6. $3x + 5y - 15 = 0$

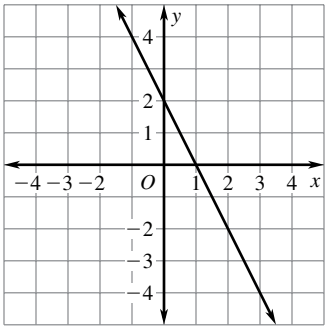
Match the equation with its graph.

7. $y = \frac{1}{2}x + 2$

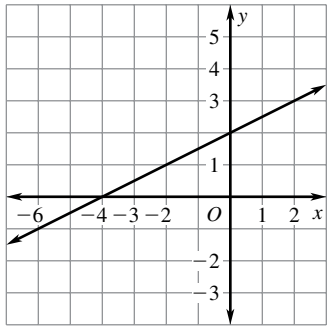
8. $y = 2x + \frac{1}{2}$

9. $y = -2x + 2$

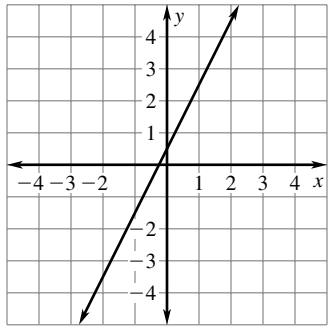
A.



B.



C.



Identify the slope and *y*-intercept of the line with the given equation. Use the slope and *y*-intercept to graph the equation.

10. $y = \frac{5}{4}x + 1$

11. $y - \frac{3}{2}x = 3$

12. $3y + 4x = 24$

13. $x - 3y = 9$

For the line with the given equation, find the slope of a parallel line and the slope of a perpendicular line.

14. $y = 12x - 1$

15. $y = \frac{6}{5}x + 144$

16. $y - 7 = 0$

17. $4y - 4x = 16$

18. $8y + 3x - 32 = 0$

19. $4x + 6y = 9$

20. Forest rangers measure a depth of 82 inches of snow on a mountain peak at 8:00 A.M. Snow is expected to fall at a steady rate of $\frac{3}{4}$ inch per hour throughout the day.

a. Write an equation that approximates the depth y of snow on the mountain peak x hours after 8:00 A.M.

b. The rangers plan to start a controlled avalanche when the depth of snow on the peak reaches 85 inches. At what time will this be?

FOCUS ON **8.5**

Name _____ Date _____

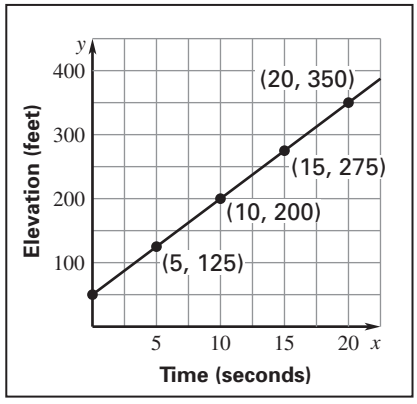
Practice

For use with pages 436–437

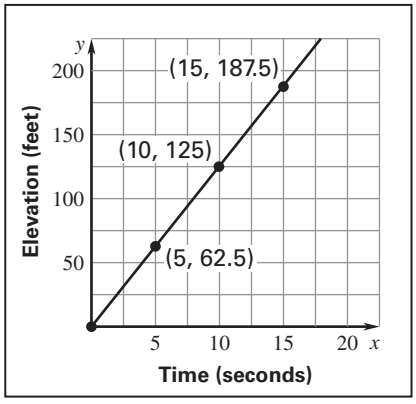
In Exercises 1 and 2, tell whether the graph represents direct variation. If so, tell which variable varies directly with the other, and identify and interpret the constant of variation. If not, explain why not.

1. Driving The graphs show a car driving up two different hills.

a.

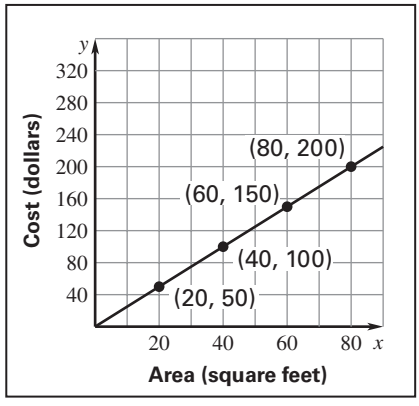


b.

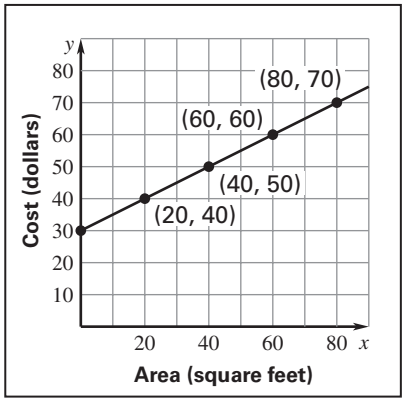


2. Painting The graphs show the cost of painting a room in your house. You can either paint the room yourself or hire a painter. In order to paint the room yourself, you need to purchase painting supplies, in addition to the cost of paint.

a.



b.



3. Ceramic Tile A store that specializes in flooring sells ceramic tile. In the direct variation equation $y = 7.5x$, y represents the cost (in dollars) of ordering a certain type of ceramic tile, and x represents the amount (in square feet) of tile ordered.

a. Graph the equation. Interpret the graph's slope in the context of the real-world solution.

b. You want to install tile in a kitchen that is 7 feet by 5 feet. Use your graph to estimate the cost of the tile.

4. Challenge At a ski slope, a T-bar transports skiers up the mountain. In the direct variation $y = 3x$, y represents the elevation (in feet), and x represents the travel time (in seconds).

a. Graph the equation. Interpret the graph's slope in the context of the real-world situation.

b. If you get on the T-bar at an elevation of 55 feet, what will the elevation be after riding the T-bar for 26 seconds?

c. If you get on the T-bar at an elevation of 55 feet, how long will it take to reach the top of a mountain that has an elevation of 442 feet?

FOCUS ON 8.5

Name _____ Date _____

Practice

For use with pages 437A-437B

1. Savings The table shows the balance in a savings account at the end of each year for 6 years. (Year 0 shows the initial amount used to open the account.)

Years, *x*	0	1	2	3	4	5	6
Balance, *y*	1000	1200	1370	1520	1740	2000	2280

a. Make a scatter plot of the data.

b. Find a linear model for the data.

c. Predict the balance in the savings account after 8 years.

2. Value The table below shows the age of a car (in years) and its corresponding value (in dollars).

Age, *x*	0	1	2	3	4	5
Value, *y*	16,000	14,000	12,200	10,300	8800	7400

a. Make a scatter plot of the data.

b. Find a linear model for the data.

c. Interpret the slope and y-intercept of the graph of the linear model.

3. Value The value y (in dollars) of a farm tractor x years after it is purchased is given by $y = -6500x + 80{,}000$.

a. Graph the equation.

b. Interpret the slope and y-intercept.

4. Challenge Suppose in Exercise 1, the x-values in the table are changed to actual years from 2005 to 2011 and a new linear model is found. How do you think the slope and y-intercept of the new model would compare to the slope and y-intercept of the model you found in Exercise 1? Explain.

LESSON 8.6

Name _____ Date _____

Practice

For use with pages 439–444

Write an equation of the line with the given slope and *y*-intercept.

1. slope $= -3$; y-intercept $= -2$

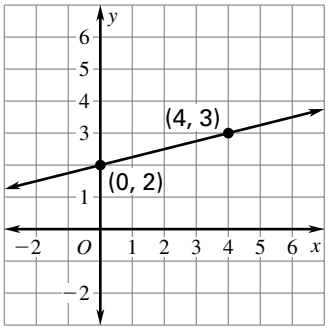
2. slope $= 5$; y-intercept $= 7$

3. slope $= -\frac{3}{4}$; y-intercept $= 3$

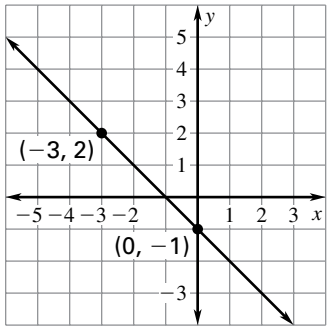
4. slope $= \frac{5}{2}$; y-intercept $= -6$

Write an equation of the line.

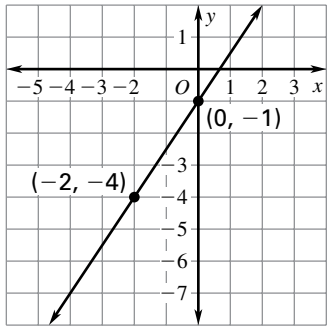
5.



6.



7.



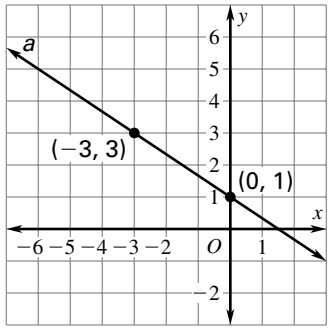
In Exercises 8–10, write an equation of the line through the given points.

8. (0, 4), (3, 3)

9. (2, −3), (0, 5)

10. (0, −2), (3, −2)

In Exercises 11 and 12, use the graph at the right.



11. Write an equation of the line that is parallel to line a and passes through the point (0, 9).

12. Write an equation of the line perpendicular to line a that passes through the point (0, −2).

13. Show that the table represents a function. Then write an equation for the function.

x	−4	−2	0	2	4
y	5	4	3	2	1

14. The table shows a boy's height measured each birthday from age 9 until age 13.

Years since age 9, *x*	0	1	2	3	4
Height (cm), *y*	133	139	143	149	156

a. Make a scatter plot of the data pairs. Draw the line that appears to best fit the points.

b. Write an equation of your line.

c. Use your equation to predict the boy's height at age 17.

d. Use your equation to approximate the boy's height on his 8th birthday to the nearest centimeter.

FOCUS ON 8.6

Name _____ Date _____

Practice

For use with pages 446–447

Graph the function for the given domain. Classify the function as discrete or continuous. Then identify the range of the function.

1. $y = 2x - 2$; domain: $x \geq -1$

2. $y = 5x + 1$; domain: $x \leq 1$

3. $y = -2x + 1$; domain: $-1, 0, 1, 2$

4. $y = 3x - 1$; domain: $x \geq -1$

5. $y = \frac{1}{2}x + 1$; domain: $-2, -1, 0, 1$

6. $y = -\frac{1}{2}x + 2$; domain: $-2, -1, 1, 2$

Write an equation for the function described. Tell whether the function is *discrete or continuous*. Then answer the question.

7. Rattlesnakes A rattlesnake's tail grows one bead longer about every year. The length of the tail is a function of years the tail grows. If the tail is 3-beads long now, in how many years will it be 12 beads long?

8. Erosion A riverbank is 7 feet long and loses 0.25 feet of shoreline per year. The width of the bank is a function of the number of years the shore erodes. In how many years will the riverbank disappear completely?

9. Plant Growth A plant is 42 inches tall and grows at a rate of 0.80 inches per year. The height of the plant is a function of the number of years the plant grows. In how many years will the plant be 58 inches tall?

10. Challenge Jeanne is making a paper chain to decorate her classroom. Each day, she adds 9 links to the chain. The length of the chain is a function of the number of days Jeanne adds new links. If the chain is 40 links long now, in how many days will it be 85 links long?

FOCUS ON **8.6**

Name _____ Date _____

Practice

For use with pages 447A-447B

Make a scatter plot of the data in the table. Identify any outliers and describe the association of the data.

1. The table shows the number of hours spent watching television each night x and the average homework percentage grade y for several students.

x	2	4	0	6	4	1	5	8	1	2	5
y	90	76	94	70	78	82	45	66	90	86	76

2. The table shows the year x and the number of attendees y for a county fair (in thousands).

x	2003	2004	2005	2006	2007	2008	2009
y	84	92	106	102	111	118	120

3. The table shows the weights x (in pounds) and the average number of tackles per game y for several football players.

x	182	220	245	302	287	250	264	239	318
y	4	2	5	3	5	6	1	3	2

4. The table shows the number of years x and the mean balance y (in hundreds of dollars) for a savings account since opening the account.

x	1	2	3	4	5	6	7
y	35	42	56	59	50	41	33

5. The table shows the number of days until a holiday x and the total daily sales for a local retail store y (in thousands of dollars).

x	30	27	22	15	12	9	7	4	1
y	80	42	51	63	66	68	74	79	85

6. **Challenge** In Exercise 1, switch the x-values and y-values by letting x represent the grade for each student and y represent the number of hours spent watching television. Is the association of the data the same? Can you still identify the outliers? Repeat this process with another exercise. Explain your results.

LESSON 8.7

Name _____ Date _____

Practice

For use with pages 448–452

Let $f(x) = 4x - 3$ and $h(x) = -5x + 7$. Find the indicated value.

1. $f(x)$ when $x = 6$

2. $h(x)$ when $x = -5$

3. x when $f(x) = -15$

4. x when $h(x) = -13$

5. $f(-3) + h(2)$

6. $f(5) - h(0)$

Graph the function.

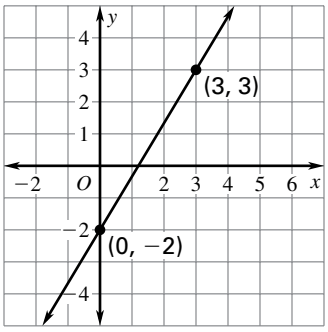
7. $g(x) = 9x - 7$

8. $h(x) = -\frac{4}{5}x + 1$

9. $f(x) = \frac{2}{7}x - 3$

Write a linear function that represents the graph.

10.



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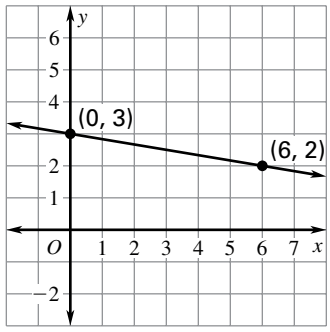

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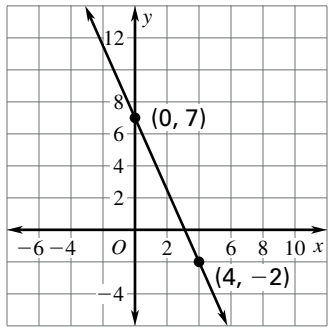


Write a linear function that satisfies the given conditions.

13. $f(0) = 40, f(30) = 65$

14. $f(-7) = 8, f(0) = 12$

15. $d(-13) = -9, d(0) = -2$

16. $g(0) = 111, g(25) = 286$

17. A PVC (polyvinylchloride) recycling plant uses recent technology to separate PVC from scrap by dissolving the PVC. By 2004, the plant had recycled a total of 20,000 metric tons of PVC. The plant recycles about 8500 metric tons per year. Let t be the number of years since 2004. Use function notation to write an equation giving the total amount of PVC recycled by the plant as a function of t.

18. Currently, there are 4120 gallons of water in Alexa's swimming pool. When filled to the recommended level, the pool holds 4550 gallons. Using a garden hose, she adds 6 gallons of water per minute to the pool.

a. Use function notation to write an equation giving the amount of water in the pool as a function of the number of minutes x that Alexa runs the hose.

b. How long will it take Alexa to fill the pool?

FOCUS ON **8.7**

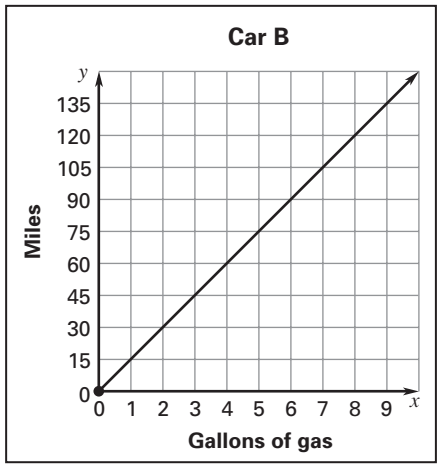
Name _____ Date _____

Practice

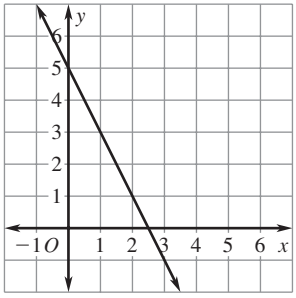
For use with pages 453A–453B

1. The table and graph show the miles y for car A and car B with x gallons of gas, respectively. Which car has the better gas mileage? Explain.

Car A	
Gallons of gas, x	**Miles, y**
3	54
6	108
9	162
12	216



2. Compare the function $f(x) = -\frac{1}{2}x - 2$ with the linear function shown in the graph.



3. A fitness club offers two membership options. Option A is a \$150 registration fee plus \$20 per month. The table shows the cost of option B.

a. Make a Compare the payment options.

b. Which option is the least expensive if you only want to join the fitness club for one year? Explain.

Months	1	2	3	4	5	6
Cost	\$35	\$70	\$105	\$140	\$175	\$210

4. **Challenge** Which function has a greater rate of change, $f(x) = 2x - 3$ or $g(x) = 10$? Explain your reasoning.

LESSON 8.8

Name _____ Date _____

Practice

For use with pages 454–458

Tell whether the ordered pair is a solution of the linear system.

1. $(-2, 1)$
$y - 2x = 5$
$2y + 2x = -2$

2. $(2, 4)$
$2y - x = 3$
$y + 4 = 4x$

3. $(3, -2)$
$2y - \frac{2}{3}x = 6$
$\frac{1}{2}y + 2x = 5$

In Exercises 4–12, solve the linear system by graphing.

4. $y = 4$
$x = 3$

5. $y = -3x - 7$
$15x + 5y = -35$

6. $y = 3x + 3$
$y + 3x = 3$

7. $4x + 5y = 10$
$3x - 3y = 21$

8. $6x - 10y = -10$
$5y = 3x + 5$

9. $6x - 4y = -2$
$-3x + 5y = -11$

10. $y = \frac{3}{4}x + 8$
$4y = 3x + 4$

11. $\frac{3}{2}y - x = 3$
$3y = 2x - 6$

12. $\frac{4}{5}x - \frac{2}{5}y = 2$
$2y = -3x + 4$

13. You are planning a family reunion. You have two options to pay for food and the banquet hall. For the first option, you can pay \$240 for the use of the banquet hall and pay a caterer \$8 per person for food. For the second option, the banquet hall will also furnish the food for \$600.

a. Write a system of equations describing the total cost of the family reunion.

b. Solve the system of equations. After how many family members are the two options equal?

c. When does the first option have the lower total cost? When does the second option have the lower cost?

14. A car enters a highway at point A and travels west at a constant speed of 55 miles per hour. One hour later, another car enters the highway at point A, and travels west at a constant speed of 65 miles per hour. How long does it take the second car to overtake the first?

15. The graphs of the three equations below form a triangle. Find the coordinates of the triangle's vertices.

$4x + y = 1$

$2x - y = 5$

$3y + 3x = 12$

FOCUS ON **8.8**

Name _____ Date _____

Practice

For use with pages 458A–458B

Graphically estimate the solution of the linear system. Then solve the system algebraically.

1. $y = -x + 1$
$y = 2x + 2$

2. $y = 6x + 1$
$y = 4x + 2$

3. $y = 3x + 5$
$x - 2y = -7$

4. $x - y = 4$
$2x + y = -9$

5. $3x - 2y = 1$
$2x + 2y = 6$

6. $4x - y = 5$
$4x - 3y + 2 = 0$

Solve the linear system algebraically.

7. $y = 2x + 8$
$y = -3x + 1$

8. $y = 5x - 8$
$y = x + 2$

9. $y = -2x - 7$
$x - y = -1$

10. $3x + y = 5$
$2x - y = 8$

11. $5x - y = 2$
$-2x + 4y = 16$

12. $6x + y = 21$
$4x - 2y - 18 = 0$

Solve the linear system by inspection.

13. $y = 4x - 2$
$y = 4x + 8$

14. $y = x + 2$
$3y = 3x + 6$

15. $x = 3$
$y = x$

16. $2x + 5y = 3$
$2x + 5y = -3$

17. $x = 5$
$y = -2$

18. $4x - 12y = 8$
$x - 3y = 2$

19. **Cost** At the local movie theater, 2 adult tickets and 4 child tickets cost \$46. The cost of 3 adult tickets and 5 child tickets is \$61.75.

a. Write a system of equations representing the cost for each family to see a movie.

b. Solve the system algebraically. How much is each adult ticket and child ticket?

20. **Challenge** Solve the linear system algebraically.

$x + y = 3$
$y + z = -7$
$3x + 2y + z = 0$

Focus on Operations 8.8

LESSON 8.9

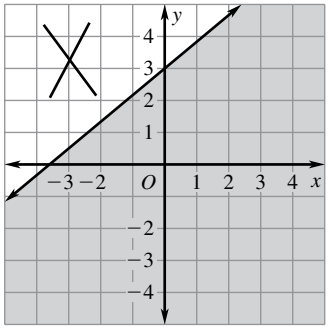
Name _____ Date _____

Practice

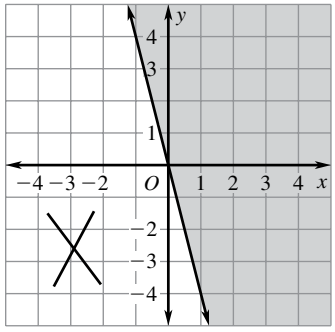
For use with pages 460–465

Describe and correct the error in the graph of the given inequality.

1. $y \leq -\frac{5}{6}x + 3$



2. $y > -4x$



Tell whether the ordered pair is a solution of the inequality.

3. $y \leq -9x - 1$; $(-1, -5)$

4. $y < 2x + 3$; $(2, 2)$

5. $x \geq -7$; $(3, -1)$

6. $2x + 3y > 15$; $(1, 4)$

Graph the inequality in a coordinate plane.

7. $-3x - 4y > -36$

8. $7x + 4y < -32$

9. $10y - 3x \leq -50$

10. $2x + y \geq 21$

11. $9y - 4x \geq 18$

12. $x + 2y < -11$

13. $y > -1$

14. $x \geq 5$

15. $y \leq 3$

16. You have \$42 to spend on museum tickets for a group of adults and children. Adult tickets are \$3 and child tickets are \$1.50.

a. Write an inequality describing the possible numbers of adult and child tickets that you can buy.

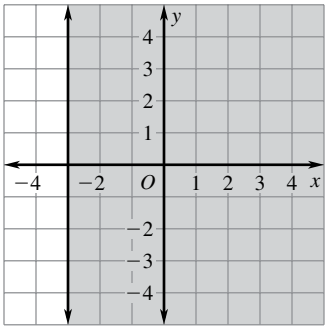
b. Graph the inequality from part (a).

c. Give three possible combinations of adult and child tickets that you can buy.

17. You are selling T-shirts and buttons as a fund-raiser for your soccer team. You want to earn at least \$136. The T-shirts cost \$12 and the buttons cost \$4. Write and graph an inequality describing the possible numbers of T-shirts and buttons you could sell.

Write an inequality to represent the graph.

18.



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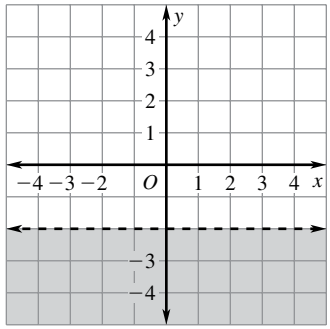

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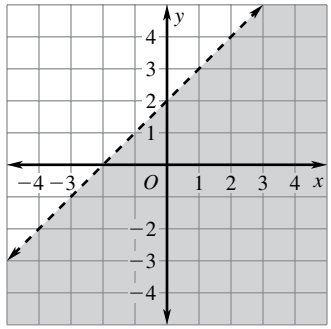


LESSON 9.1

Name _____ Date _____

Practice

For use with pages 477–481

Find the square roots of the number.

1. 36 **2.** 361 **3.** 729

4. 1089 **5.** 4900 **6.** 10,000

Approximate the square root to the nearest integer.

7. $\sqrt{39}$ **8.** $-\sqrt{85}$ **9.** $\sqrt{105}$

10. $-\sqrt{136}$ **11.** $\sqrt{17.4}$ **12.** $-\sqrt{3.3}$

Use a calculator to approximate the square root. Round to the nearest tenth.

13. $\sqrt{5}$ **14.** $-\sqrt{12}$ **15.** $\sqrt{102}$

16. $-\sqrt{74}$ **17.** $\sqrt{1585}$ **18.** $\sqrt{27.8}$

Evaluate the expression when $a = 72$ and $b = 8$.

19. $\sqrt{a - b}$ **20.** $\sqrt{a + b + 1}$ **21.** $-4\sqrt{ab}$

Solve the equation. Round to the nearest tenth if necessary.

22. $x^2 = 64$ **23.** $y^2 = 324$ **24.** $225 = n^2$

25. $t^2 = 42$ **26.** $150 = c^2$ **27.** $5y^2 = 48$

Solve the equation. Round to the nearest hundredth if necessary.

28. $2x^2 = 32$ **29.** $90 = 1.5t^2 + 8$ **30.** $5n^2 - 4 = 74$

31. A square ice skating rink has an area of 1849 square feet. What is the perimeter of the rink?

32. A forest ranger is stationed in a 58 foot tall fire tower. The equation for the distance in miles that the ranger can see is $d = \sqrt{1.5h}$, where h is the height in feet above the ground. Find the distance the ranger can see. Round your answer to the nearest tenth.

LESSON 9.2

Name _____ Date _____

Practice

For use with pages 482–485

Simplify the expression.

1. $\sqrt{54}$

2. $\sqrt{112}$

3. $\sqrt{176}$

4. $\sqrt{180}$

5. $\sqrt{117f}$

6. $\sqrt{432y^2}$

7. $\sqrt{\frac{120}{121}}$

8. $\sqrt{\frac{75}{225}}$

9. $\sqrt{\frac{202}{256}}$

10. $\sqrt{\frac{320}{441}}$

11. $\sqrt{\frac{21v^2}{324}}$

12. $\sqrt{\frac{94t}{196}}$

13. A square has an area of 700 square units. Find the length of a side of the square as a radical expression in simplest form.

Simplify the expression.

14. $\sqrt{171cd^2}$

15. $\sqrt{152m^2n}$

16. $\sqrt{126x^2y^2}$

17. $\sqrt{\frac{23w^2}{49}}$

18. $\sqrt{\frac{45rt^2}{144}}$

19. $\sqrt{\frac{76p^2q^2}{81}}$

20. After a car accident on a dry asphalt road, an investigator measures the length ℓ (in feet) of a car's skid marks. The expression $\sqrt{18\ell}$ gives the car's speed in miles per hour at the time the brakes were applied.

a. Write the expression in simplest form.

b. The skid marks are 140 feet long. Use the simplified expression to approximate the car's speed when the brakes were applied.

21. You drop a stick from the top of a building that is 245 feet high. You can use the expression $\sqrt{\frac{245}{16}}$ to find the time in seconds that it takes the stick to hit the ground. Write the expression in simplest form. Then approximate the value of the expression to the nearest second.

FOCUS ON

9.2 Practice

Name _____ Date _____

For use with pages 486-487

Simplify the expression.

1. $\sqrt{14} \cdot \sqrt{8}$

2. $\sqrt{20} \cdot \sqrt{10}$

3. $\sqrt{18} \cdot \sqrt{7}$

4. $\sqrt{6} \cdot \sqrt{18}$

5. $\frac{\sqrt{7}}{\sqrt{3}}$

6. $\frac{\sqrt{4}}{\sqrt{5}}$

7. $\frac{\sqrt{8}}{\sqrt{4}}$

8. $\frac{\sqrt{28}}{\sqrt{21}}$

9. $5\sqrt{3} - 2\sqrt{3}$

10. $7\sqrt{5} - \sqrt{125}$

11. $6\sqrt{6} - \sqrt{6}$

12. $6\sqrt{50} + 3\sqrt{50}$

13. $7\sqrt{5} + 4\sqrt{45}$

14. $4\sqrt{7} + 2\sqrt{28}$

15. $4\sqrt{6} - \sqrt{3} + 5\sqrt{6}$

16. $7\sqrt{3} - \sqrt{8} - 2\sqrt{3}$

17. Tidal Wave The expression $\sqrt{15d}$ gives the approximate velocity (in feet per second) of a tidal wave in water of depth d (in feet). If one tidal wave is in water with a depth of 52 feet and another tidal wave is in water with a depth of 30 feet, what is the difference in velocity between the two tidal waves? Round your answer to the nearest tenth.

18. Sailing The crow's nest on a ship allows sailors to see land. The expression $\sqrt{\frac{3h}{2}}$ represents the distance d (in miles) a sailor can see from a height h (in feet) above the water. If the deck is 8 feet above the water and the crow's nest is 10 feet above the deck, about how much farther can a sailor in the crow's nest see than a sailor on the deck? Round your answer to the nearest tenth.

19. Challenge The minimum speed (in miles per hour) at which a car was traveling when it began to skid can be approximated using the expression $\sqrt{30df}$ where d is the length of the skid marks (in feet) and f is the coefficient of friction for the road. Approximately how much faster was a car going if it leaves a skid mark 42 feet long on a concrete road with a coefficient of friction $f = 0.75$ than a car that leaves a skid mark 30 feet long on a dirt road with a coefficient of friction $f = 0.35$?

LESSON 9.3

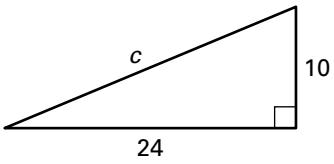
Name _____ Date _____

Practice

For use with pages 488–493

Find the unknown length. Write your answer in simplest form.

1.



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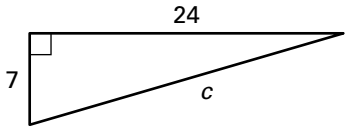

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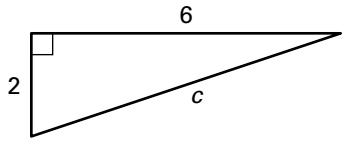

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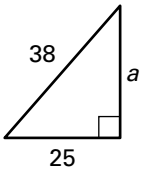

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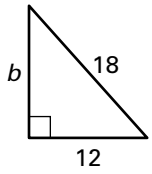

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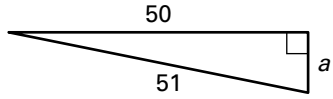


Determine whether the triangle with the given side lengths is a right triangle.

7. 8, 15, 17

8. 20, 21, 28

9. 9, 12, 15

10. 11, 13, 17

11. 5, 64, 65

12. 12, 25, 27

The lengths of two sides of a right triangle are given. Find the length of the third side.

13. $a = 9, c = 41$

14. $a = 40, c = 58$

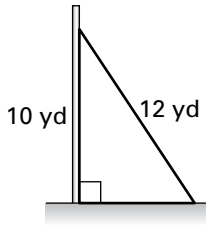
15. $b = 56, c = 65$

16. $b = 70, c = 74$

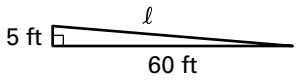
17. $a = 13, b = 84$

18. $a = 16, b = 63$

19. A support wire 12 yards long is attached to the top of a utility pole 10 yards tall and is then stretched taut. To the nearest tenth of a yard, find how far from the base of the pole the wire will be attached to the ground.

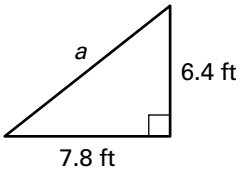


20. An access ramp has a height of 5 feet and a horizontal distance of 60 feet. Find the length ℓ of the ramp to the nearest tenth of a foot.



Find the unknown length. Round to the nearest hundredth, if necessary.

21.



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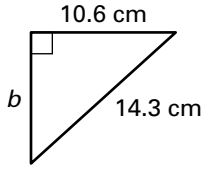

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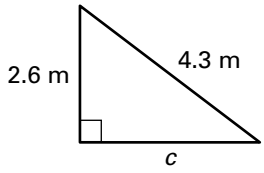


FOCUS ON

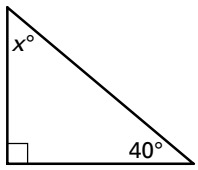
9.3 Practice

Name _____ Date _____

For use with pages 494-495

Find the value of *x*.

1.



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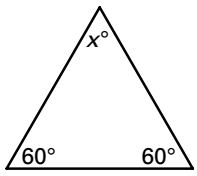

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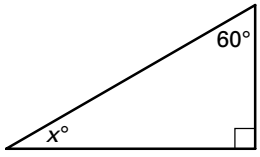

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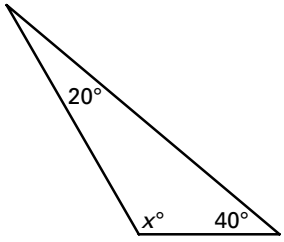
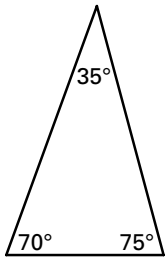


Classify the triangle by its angle measures.

5.



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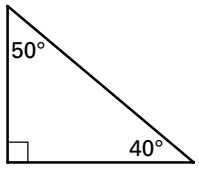

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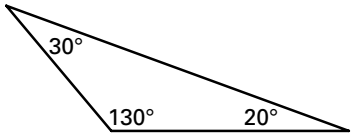

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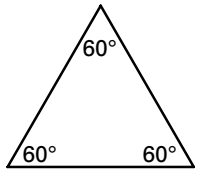
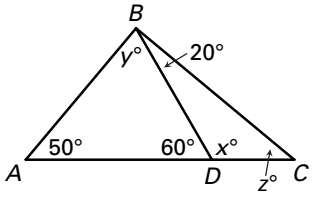
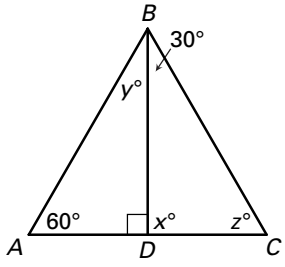


Find the values of *x*, *y*, and *z*. Then classify all triangles in the diagram by their angle measures.

9.



10.



11. Bermuda Triangle The Bermuda Triangle is an area of water shaped like a triangle. The three vertices of the triangle are formed by locations in Miami, Bermuda, and Puerto Rico. If the measure of the angle at Miami is 65° and the measure of the angle at Puerto Rico is 60°, what is the measure of the angle at Bermuda? What type of triangle is the Bermuda Triangle?

12. Challenge A new playground in the shape of a right triangle is being built in Summer City. If two of the angles that form the playground have the same measure, what are the measures of the three angles that form the playground?

LESSON 9.4

Name _____ Date _____

Practice

For use with pages 496–500

Tell whether the number is *rational* or *irrational*.

1. $\frac{1}{7}$ **2.** $\sqrt{\frac{1}{7}}$ **3.** $1.\overline{12}$ **4.** $-\sqrt{17}$

5. $-\sqrt{\frac{8}{2}}$ **6.** $\sqrt{\frac{21}{3}}$ **7.** $\frac{\sqrt{5}}{16}$ **8.** $\frac{\sqrt{16}}{5}$

Complete the statement using <, >, or =.

9. $\sqrt{\frac{1}{4}} \_\_?\_\_ \frac{1}{4}$ **10.** $4 \_\_?\_\_ \sqrt{\frac{32}{2}}$ **11.** $-\sqrt{8} \_\_?\_\_ -\frac{10}{3}$

In Exercises 12–15, use a number line to order the numbers from least to greatest.

12. $\frac{12}{11}, \sqrt{1.1}, \frac{\sqrt{10}}{3}, \sqrt{\frac{10}{3}}$

13. $4.2, \sqrt{17}, \frac{17}{4}, \sqrt{\frac{81}{5}}$

14. $\sqrt{\frac{5}{9}}, \frac{2}{3}, \sqrt{\frac{7}{9}}, 0.7514, 0.\overline{75}$

15. $\sqrt{31}, 5.5, \frac{\sqrt{75}}{2}, \frac{28}{5}, \sqrt{\frac{55}{2}}$

16. One leg of a right triangle is 6 inches long. The other leg is 8 inches long. Is the length in inches of the hypotenuse a *rational* or *irrational* number?

17. From a balcony, you drop a penny 50 feet to the ground. The time t in seconds it takes the penny to hit the ground is approximated by $t = \sqrt{\frac{25}{8}}$. Does t represent a rational or an irrational number of seconds? Give the value of t to the nearest hundredth of a second.

18. You want to buy some frozen pizzas that have a diameter of 18 inches. You need to be able to fit them into your upright freezer that has a capacity of 4.5 cubic feet. The storage compartment of the freezer is 2 feet high. The width and depth of the compartment can be found using the expression $\sqrt{\frac{4.5}{2}}$. Will the pizzas lay flat on the shelves of your freezer? Explain.

19. Use a right triangle to graph $\sqrt{8}$ on a number line.

FOCUS ON **9.4**

Name _____ Date _____

Practice

For use with pages 500A-500B

Approximate the square root to the nearest tenth.

1. $\sqrt{11}$ **2.** $\sqrt{33}$ **3.** $\sqrt{67}$

4. $\sqrt{112}$ **5.** $\sqrt{139}$ **6.** $\sqrt{182}$

7. $\sqrt{200}$ **8.** $\sqrt{254}$ **9.** $\sqrt{390}$

10. $-\sqrt{52}$ **11.** $-\sqrt{155}$ **12.** $-\sqrt{310}$

Complete the statement using <, >, or =.

13. $\sqrt{56}$ __?__ $\sqrt{54}$ **14.** $\sqrt{45}$ __?__ $5\sqrt{3}$

15. $2\sqrt{7}$ __?__ $\sqrt{38}$ **16.** $2\sqrt{27}$ __?__ $6\sqrt{3}$

17. $3\sqrt{15}$ __?__ $3\sqrt{11}$ **18.** $4\sqrt{26}$ __?__ $5\sqrt{10}$

19. $-\sqrt{96}$ __?__ $-\sqrt{88}$ **20.** $-2\sqrt{15}$ __?__ $-\sqrt{60}$

21. **Geometry** Given three side lengths, a triangle can only exist if the sum of the two smaller side lengths is greater than the largest side length.

a. Order 3, $\sqrt{31}$, and 5 from least to greatest.

b. From your order in part (a), add the two smaller numbers. Is that sum greater than the largest number?

c. If your answer to part (b) is "yes" than a triangle can be formed with those side lengths. If your answer to part (b) is "no" than a triangle cannot be formed. Can a triangle be formed with the given lengths?

d. Follow steps (a), (b), and (c) using the following set of numbers: $\sqrt{114}$, 6, 4.

22. **Challenge** Find a different method for comparing rational numbers. Compare the rational numbers below using your method and explain your steps.

a. $\sqrt{58}$ __?__ $\sqrt{82}$ **b.** $15\sqrt{2}$ __?__ $3\sqrt{51}$

LESSON 9.5

Name _____ Date _____

Practice

For use with pages 502–507

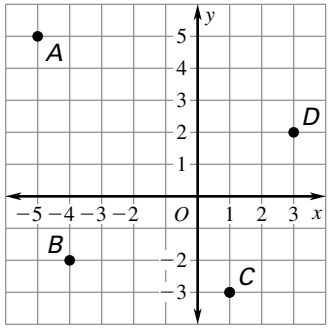
Find the distance between the points. Write your answer in simplest form.

1. A and B

2. B and C

3. C and D

4. D and A



Find the distance between the points. Write your answer in simplest form.

5. $(-12, -8), (3, 11)$

6. $(0, 7), (-2, -1)$

7. $(1.5, -2), (-4, 6)$

8. $(4.9, -1), (7.4, -6)$

9. $(5.5, -3), (2.5, -7)$

10. $(4, -3.5), (-2, 8.5)$

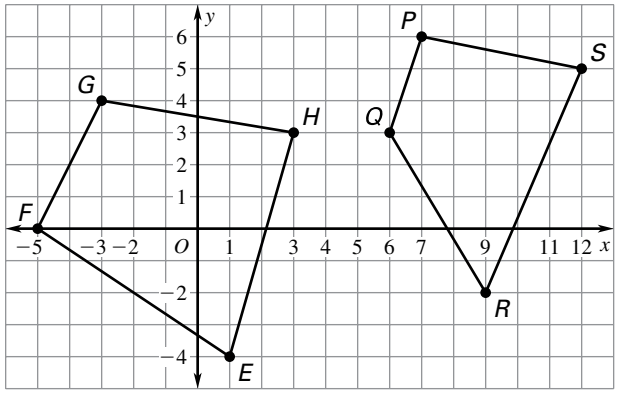
Find the midpoint of the segment.

11. $\overline{GH}$

12. $\overline{HE}$

13. $\overline{EF}$

14. $\overline{FG}$



Find the slope of the line through the given points.

15. P and Q

16. Q and R

17. R and S

18. P and S

Find the midpoint of the segment with the given endpoints.

19. $(-9, -8), (1, 2)$

20. $(4, -5), (-2, 7)$

21. $(1.6, 0), (5.4, -3)$

22. $(-3.2, -1.2), (7.8, 6.8)$

23. $(-12, 5.4), (14, 3.6)$

24. $\left(15, -3\frac{1}{2}\right), (13, -1)$

Find the slope of the line through the given points.

25. $(8, -12), (10, -3)$

26. $(-9, 11), (7, -5)$

27. $(3.2, 7), (1.6, -9)$

28. $(6, -4.5), (1, -3.7)$

29. $\left(4\frac{3}{4}, -6\right), \left(1\frac{1}{4}, 5\right)$

30. $\left(12, \frac{9}{10}\right), \left(-11, \frac{3}{10}\right)$

31. The points $P(-4, 6)$, $Q(-4, -3)$, and $R(8, -3)$ are the vertices of a right triangle in a coordinate plane.

a. Draw the triangle in a coordinate plane.

b. Find the coordinates of the midpoint M of the hypotenuse of $\triangle PQR$.

LESSON 9.6

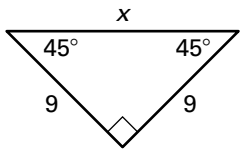
Name _____ Date _____

Practice

For use with pages 508–513

Find the unknown length. Write your answer in simplest form.

1.



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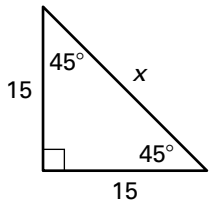

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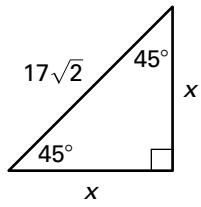

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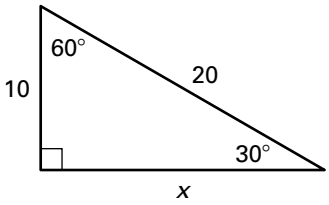

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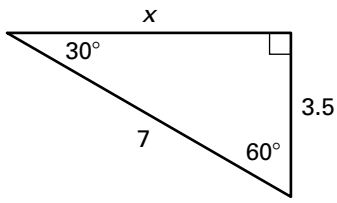

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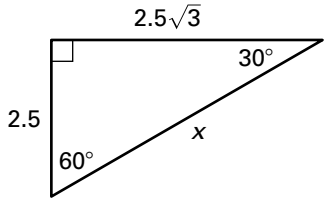
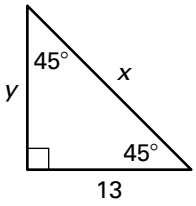


7. How is the length of the hypotenuse in a 30°-60°-90° triangle related to the length of the shorter leg?

Find the unknown lengths. Write your answers in simplest form.

8.



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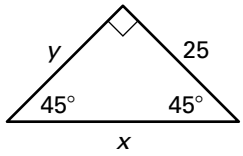

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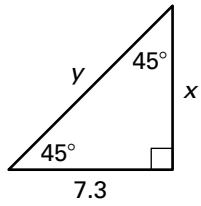

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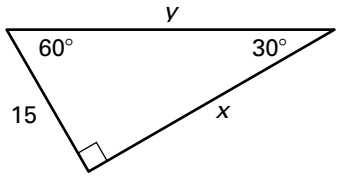

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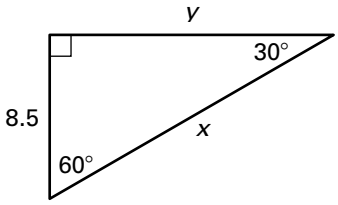

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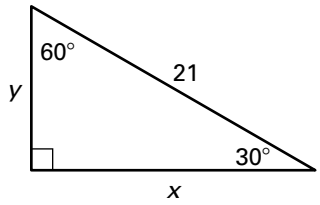
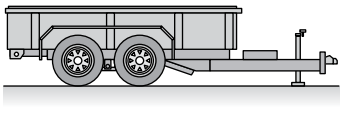
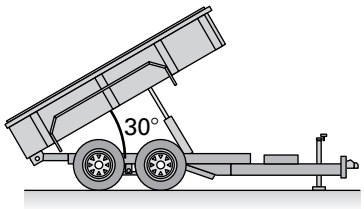
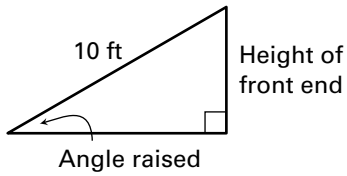


14. A 10-foot tipping trailer is being used to haul gravel. To unload the gravel, the front end of the trailer is raised. How high is the front end of a 10-foot tipping trailer when it is tipped by a 30° angle? by a 45° angle? Round your answers to the nearest foot.







LESSON 9.7

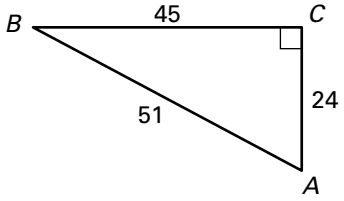
Name _____ Date _____

Practice

For use with pages 514–519

Find the tangent of each acute angle. Write your answers as fractions in simplest form.

1.



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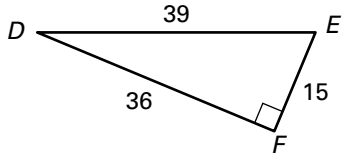

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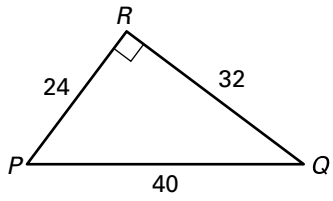


Use a calculator to approximate the tangent value to four decimal places.

4. tan 32°

5. tan 68°

6. tan 43°

7. tan 76°

8. tan 14°

9. tan 82°

Use the table of trigonometric ratios on page 869 to write the value of the tangent.

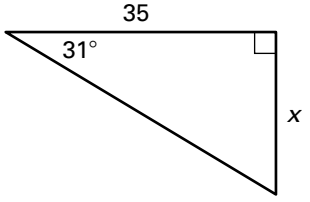
10. tan 22°

11. tan 56°

12. tan 39°

In Exercises 13–15, find the value of *x*. Round to the nearest tenth.

13.



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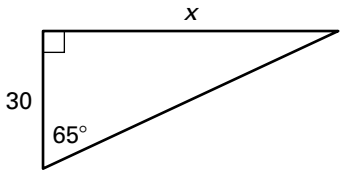

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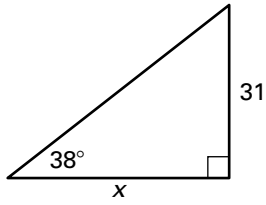
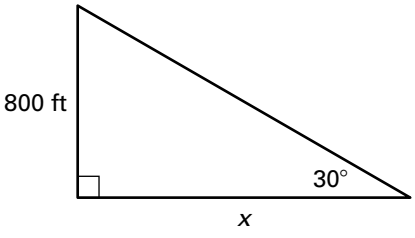
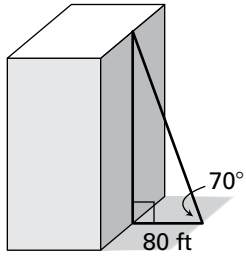


16. A hot air balloon climbs, at a 30° angle to the ground, to a height of 800 feet. To the nearest tenth of a foot, what ground distance has the balloon traveled to reach 800 feet?



17. You are standing 80 feet from the base of a building. You estimate that the angle of elevation from your feet to the top of the building is about 70°. About how tall is the building?



LESSON 9.8

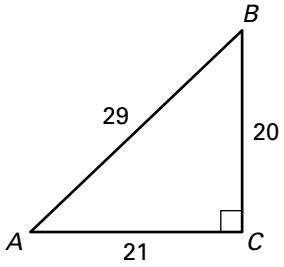
Name _____ Date _____

Practice

For use with pages 520–525

Find the sine and cosine of each acute angle. Write your answers in simplest form.

1.



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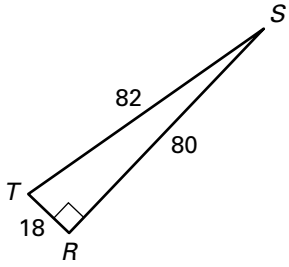

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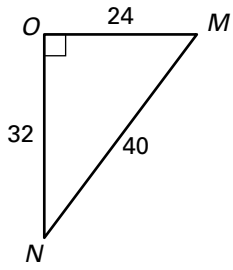


Approximate the sine or cosine value to four decimal places.

4. sin 45°

5. cos 17°

6. sin 25°

7. cos 37°

8. sin 35°

9. cos 58°

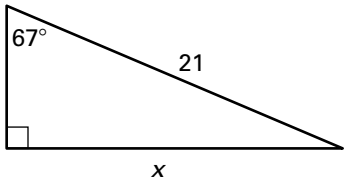
10. sin 8°

11. cos 62°

12. sin 44°

Find the value of *x* to the nearest tenth.

13.



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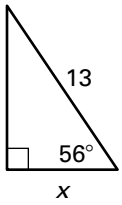

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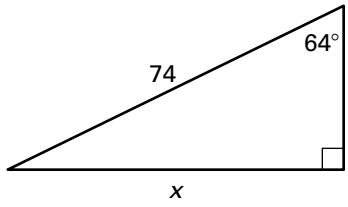

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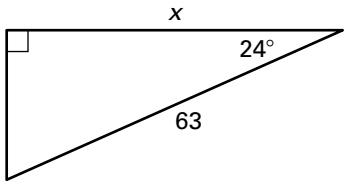
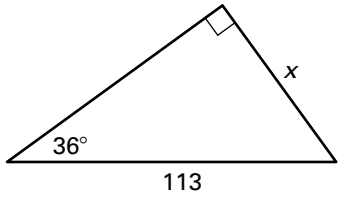
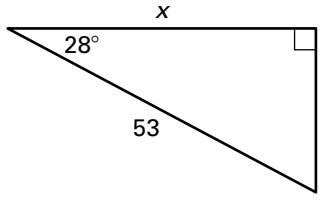


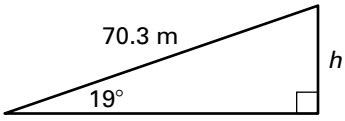
17.



18.



19. A water slide is 70.3 meters long and makes an angle of 19° with the ground. To the nearest tenth of a meter, what is the height *h* of the water slide?



LESSON 10.1

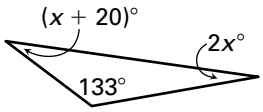
Name _____ Date _____

Practice

For use with pages 537–541

Find the value of x. Then classify the triangle by its angle measures.

1.



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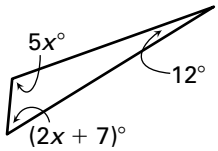

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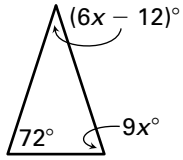

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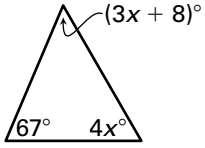

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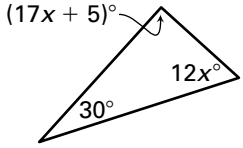
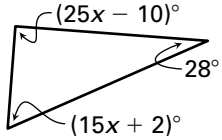


6.



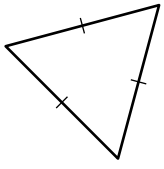
7. The perimeter of an equilateral triangle is 156 feet. Find the length of each side.

8. The perimeter of an isosceles triangle is 89 centimeters. The length of one side is 35 centimeters. The lengths of the other two sides are equal. Find the lengths of the other two sides.

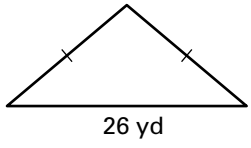
9. The ratio of the angle measures in a triangle is 11 : 14 : 20. Find the angle measures. Then classify the triangle by its angle measures.

Find the unknown side lengths of the triangle given the perimeter P. Then classify the triangle by its side lengths.

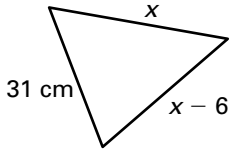
10. $P = 51$ in.



11. $P = 64$ yd

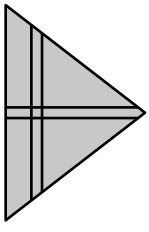


12. $P = 93$ cm



13. The ratio of the side lengths of a triangle is 4 : 7 : 9. The perimeter of the triangle is 120 feet. Find the side lengths. Then classify the triangle by its side lengths.

14. A sailboat flies the flag of a sailing club. The ratio of the side lengths of the flag is 9 : 9 : 11. The perimeter of the flag is 116 inches. Find the side lengths. Then classify the triangle by its side lengths.



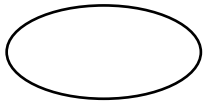
LESSON 10.2

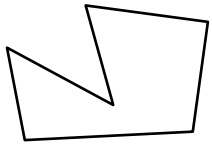
Name _____ Date _____

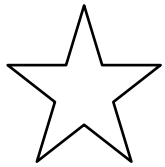
Practice

For use with pages 542–546

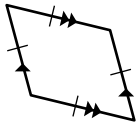
Tell whether the figure is a polygon. If it is a polygon, classify it and tell whether it is *convex* or *concave*. If it is not, explain why.

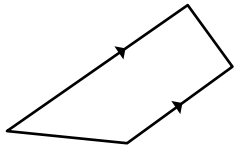
1. 

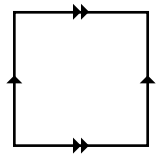
2. 

3. 

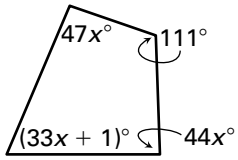
Classify the quadrilateral.

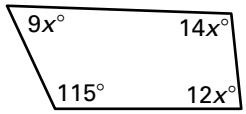
4. 

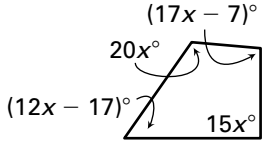
5. 

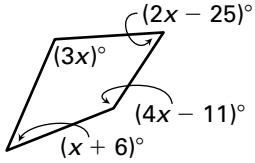
6. 

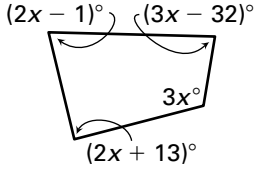
Find the value of *x*.

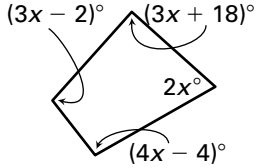
7. 

8. 

9. 

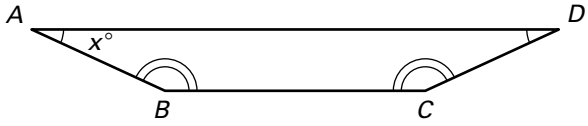
10. 

11. 

12. 

13. A quadrilateral has both pairs of opposite sides parallel. Sketch and classify the quadrilateral.

14. For the trapezoid shown, the ratio $m\angle B : m\angle D$ is 5 : 1. Write and solve an equation to find the value of x.



LESSON 10.3

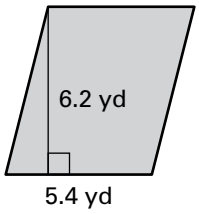
Name _____ Date _____

Practice

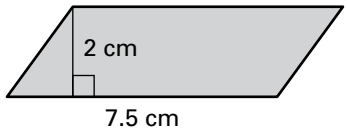
For use with pages 547–552

Find the area of the parallelogram.

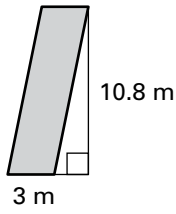
1.



2.

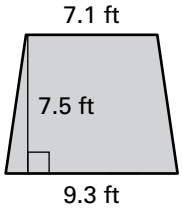


3.

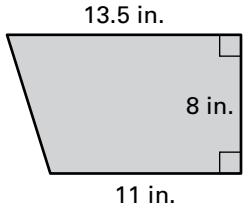


Find the area of the trapezoid.

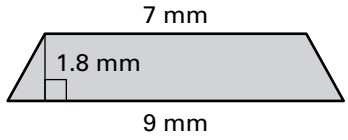
4.



5.



6.

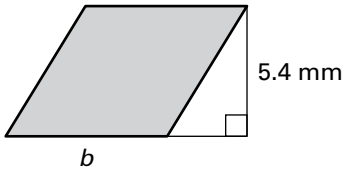


7. The base of a parallelogram is 28.4 centimeters. The height is one fourth of the base. Find the area of the parallelogram.

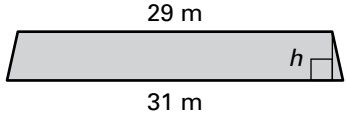
8. The height of a trapezoid is 13 yards. One of the bases is 2.5 times the height, and the other base is two times the height. Find the area of the trapezoid.

Find the unknown measure of the parallelogram or trapezoid.

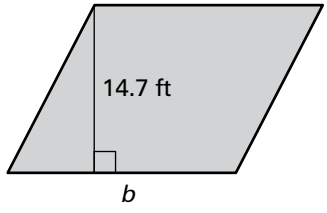
9. $A = 36.18 \text{ mm}^2$



10. $A = 135 \text{ m}^2$



11. $A = 294 \text{ ft}^2$



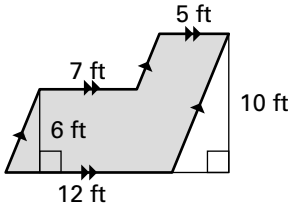
In Exercises 12 and 13, plot the points in a coordinate plane. Connect the points so that they form a polygon. Identify the polygon and find its area.

12. $(-3, 1), (3, 2), (3, -2), (-3, -3)$

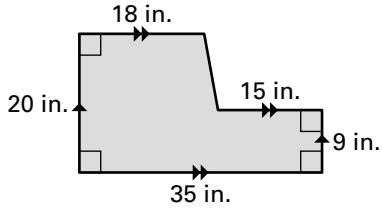
13. $(-5, 4), (-3, 2), (-3, -4), (-5, -4)$

Find the area of the figure.

14.



15.



LESSON 10.4

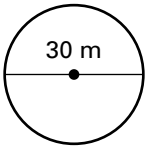
Name _____ Date _____

Practice

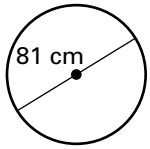
For use with pages 553–559

Find the circumference of the circle. Use 3.14 or $\frac{22}{7}$ for π. Round to the nearest whole number.

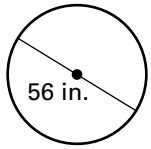
1.



2.

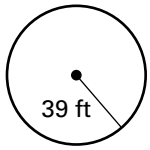


3.

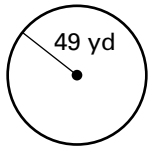


4.

5.



6.



For a circle with the given circumference *C*, find the radius and diameter of the circle. Round to the nearest whole number.

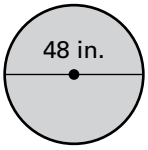
7. $C = 63$ m

8. $C = 91$ ft

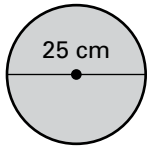
9. $C = 132$ in.

Find the area of the circle. Use 3.14 or $\frac{22}{7}$ for π. Round to the nearest whole number.

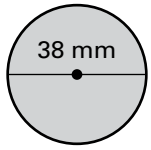
10.



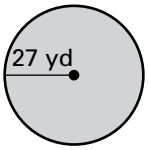
11.



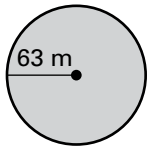
12.



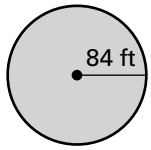
13.



14.



15.



For a circle with the given area *A*, find the radius and diameter of the circle. Round to the nearest whole number.

16. $A = 113$ cm^2

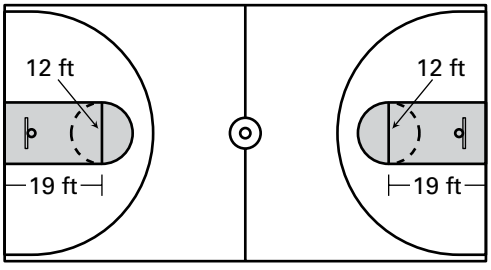
17. $A = 3018$ ft^2

18. $A = 7850$ m^2

19. A manhole cover has a diameter of 24 inches. Find the circumference of the manhole cover to the nearest inch.

20. The base of a yogurt container has a circumference of about 22 centimeters. Find the radius and diameter of the base to the nearest centimeter.

21. Find the shaded area of the basketball court to the nearest foot.



LESSON 10.5

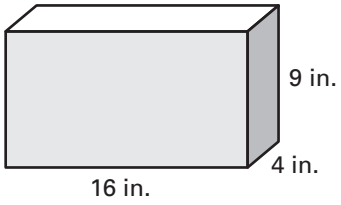
Name _____ Date _____

Practice

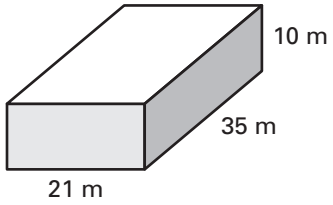
For use with pages 563–569

Draw a net for the solid. Then find the surface area. Round to the nearest whole number.

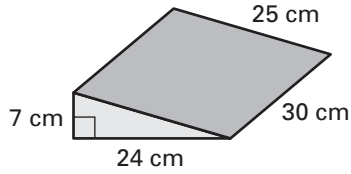
1.



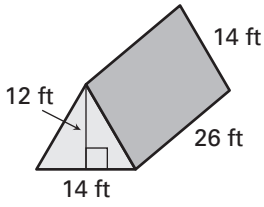
2.



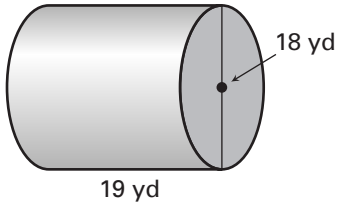
3.



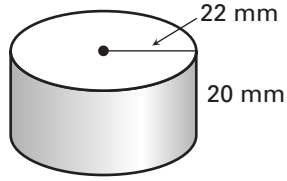
4.



5.

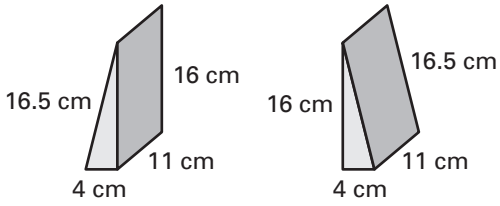


6.



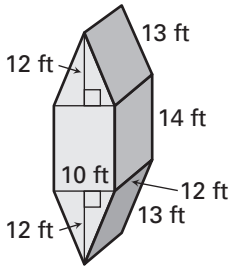
7. A sculpture is approximately in the shape of a cylinder. The diameter is 10 inches, and the height is 6 inches. Find the surface area of the sculpture. Round to the nearest square inch.

8. Find the surface area of the bookends shown.

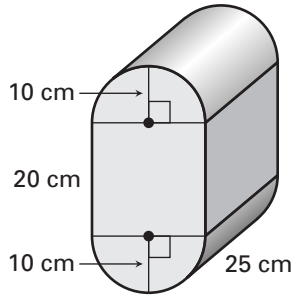


The solids shown are composed of prisms and half cylinders. Find the surface area of the solid. Round to the nearest whole number.

9.



10.



LESSON 10.6

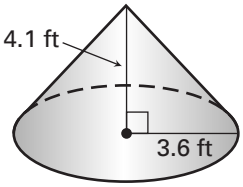
Name _____ Date _____

Practice

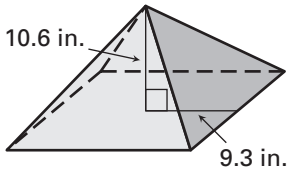
For use with pages 570–575

Find the slant height of the pyramid or cone. Round to the nearest tenth.

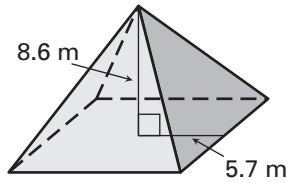
1.



2.

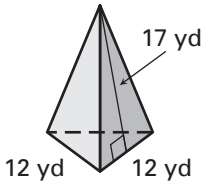


3.



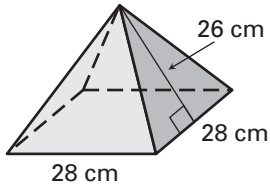
Find the surface area of the regular pyramid.

4.

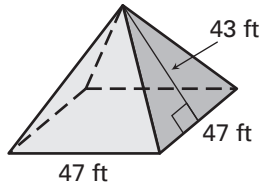


$B \approx 62.4 \text{ yd}^2$

5.

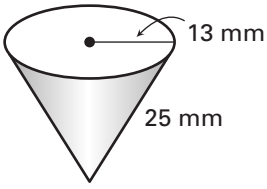


6.

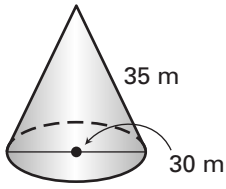


Find the surface area of the cone. Round to the nearest whole number.

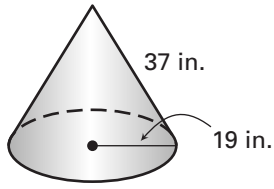
7.



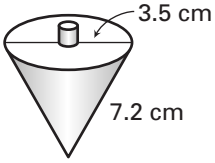
8.



9.

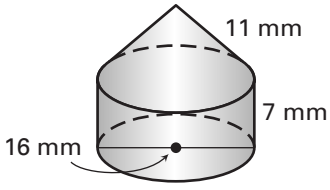


10. The base of a top is shaped like a cone with a diameter of 3.5 cm. Find the surface area of the cone. Round to the nearest whole number.

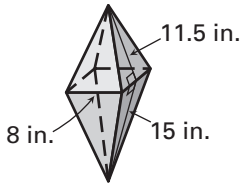


The solids shown are composed of cones, cylinders, and pyramids. Find the surface area of the solid. Round to the nearest whole number.

11.



12.



FOCUS ON **10.6**

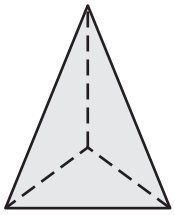
Name _____ Date _____

Practice

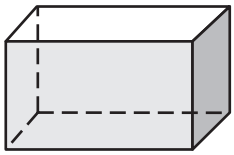
For use with pages 575A-575B

List all of the two-dimensional figures that can be formed by slicing the solid with differently-oriented planes.

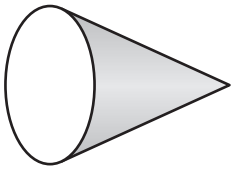
1.



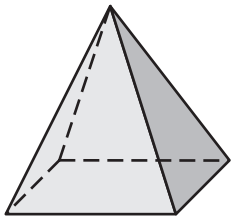
2.



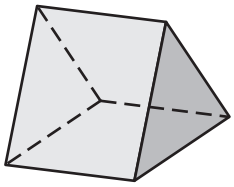
3.



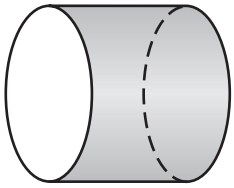
4.



5.

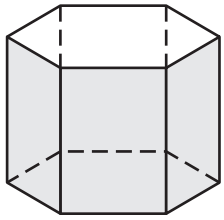


6.



7. Sphere A small piece of a foam sphere is being cut off so that the sphere will sit flat on a table and not roll off. Describe the shape that is formed by the cut.

8. Challenge List all of the two-dimensional figures that can be formed by slicing the hexagonal prism with differently-oriented planes.



LESSON 10.7

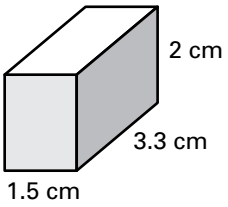
Name _____ Date _____

Practice

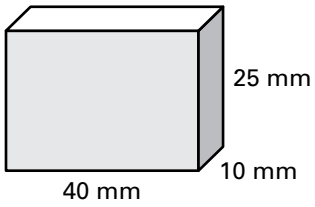
For use with pages 578–582

Find the volume of the prism or cylinder. Round to the nearest whole number.

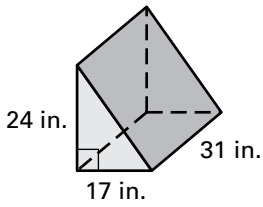
1.



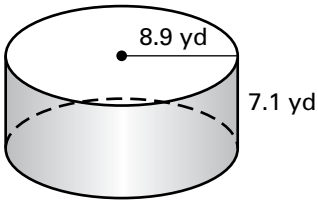
2.



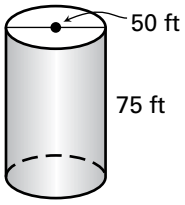
3.



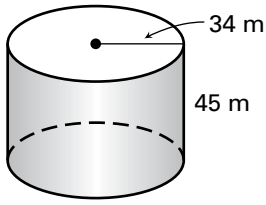
4.



5.



6.

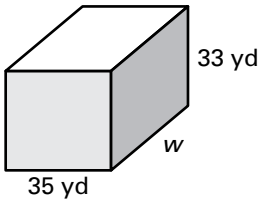


7. Find the volume to the nearest millimeter of a cylinder that is 45 millimeters tall and has a diameter of 26 millimeters.

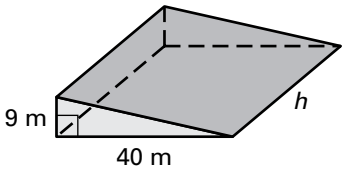
8. You are mailing a gift box that is 18 inches by 8 inches by 12 inches. You want to put it in a larger box and surround it with foam packing. The larger box is 20 inches by 12 inches by 15 inches. How many cubic inches are there for the foam packing?

Find the unknown dimension. Round to the nearest whole number.

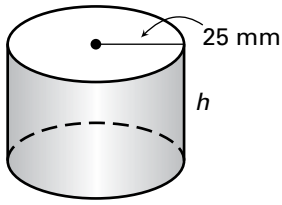
9. $V = 57{,}750 \text{ yd}^3$



10. $V = 8640 \text{ m}^3$

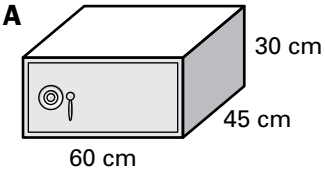


11. $V = 64{,}795 \text{ mm}^3$

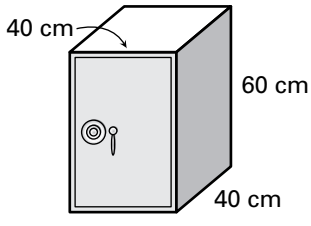


12. Tell which safe holds more.

Safe A

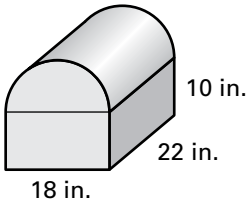


Safe B

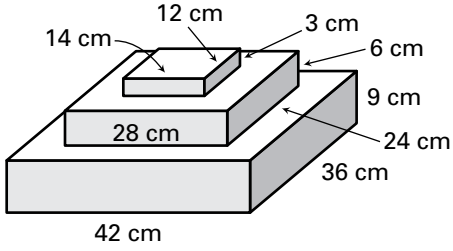


The solids shown are composed of prisms and half cylinders. Find the volume of the solid. Round to the nearest whole number.

13.



14.



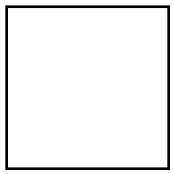
Name _____ Date _____

FOCUS ON **10.7**

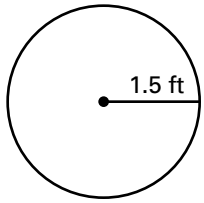
Practice

For use with pages 584–585

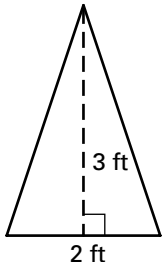
1. Find the area of the square in square meters.



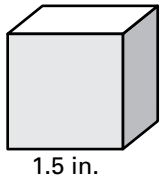
2. Find the area of the circle in square inches.



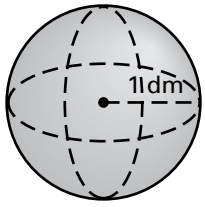
3. Find the area of the triangle in square yards.



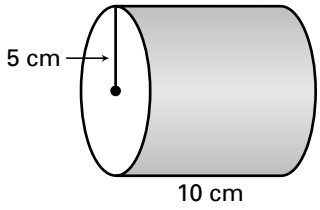
4. Find the volume of the cube in cubic feet.



5. Find the volume of the sphere in cubic centimeters.



6. Find the volume of the cylinder in cubic decimeters.



7. Find the area in square feet of a triangle that has a base of 12 yards and a height of 8 yards.

8. Find the area in square centimeters of a rectangle that has a length of 12 inches and a width of 3 inches.

9. Find the volume in cubic yards of a rectangular prism that has a length of 6 feet, a width of 3 feet, and a height of 6 feet.

10. Find the volume in cubic decimeters of a sphere that has a radius of 280 centimeters.

Copy and complete the statement using <, >, or =.

11. 864 $in.^2$ __?__ 6 ft^2

12. 50 cm^2 __?__ 5 dm^2

13. 300 cm^3 __?__ 15 $in.^3$

14. 1.5 yd^2 __?__ 13.5 ft^2

15. 14 m^3 __?__ 21 yd^3

16. 10 mi^3 __?__ 40.5 km^3

17. Challenge A lawn is a square that has a side length of 25 yards. A second lawn is a rectangle with a length of 35 meters and a width of 10 meters. You are mowing each lawn and get paid one dollar for every 100 square feet you mow. Which lawn has the greater area and how much money will you get paid for mowing each lawn?

LESSON 10.8

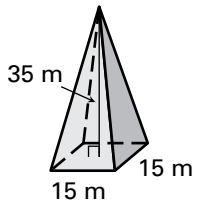
Name _____ Date _____

Practice

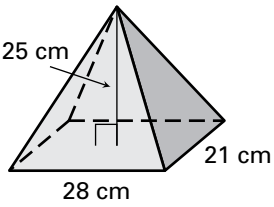
For use with pages 586–591

Find the volume of the pyramid or cone. Round to the nearest whole number.

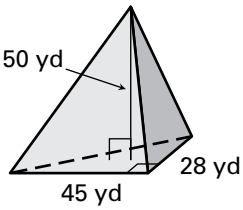
1.



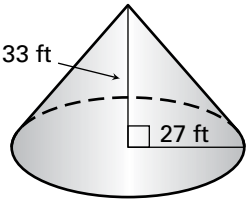
2.



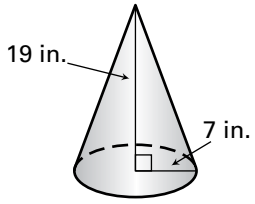
3.



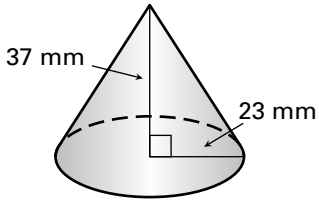
4.



5.

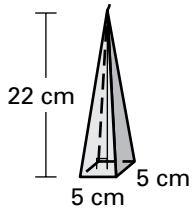


6.

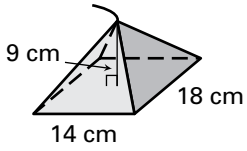


7. The candles shown are shaped like pyramids. Find the volume to the nearest cubic centimeter of each pyramid. Then tell which candle has the greater volume.

Candle A

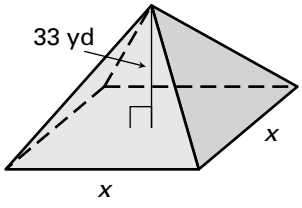


Candle B

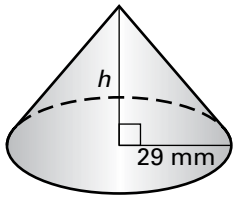


Find the unknown dimension. Round to the nearest whole number.

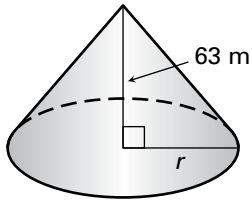
8. $V = 29{,}744 \text{ yd}^3$



9. $V = 31{,}705 \text{ mm}^3$

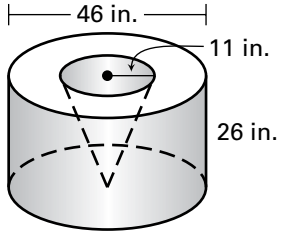


10. $V = 171{,}597 \text{ m}^3$

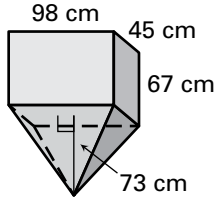


The solid in Exercise 11 is a cylinder with a cone-shaped hole in it. The solid in Exercise 12 is composed of a prism and a pyramid. Find the volume of the solid. Round your answer to the nearest whole number.

11.



12.



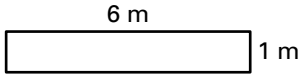
FOCUS ON

10.8 Practice

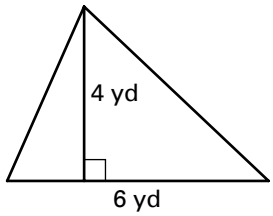
Name _____ Date _____

For use with pages 592–593

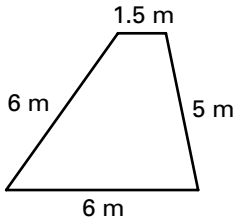
1. Find the perimeter of the rectangle after multiplying its dimensions by 3.



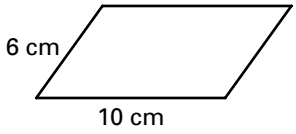
2. Find the area of the triangle after multiplying its dimensions by 0.5.



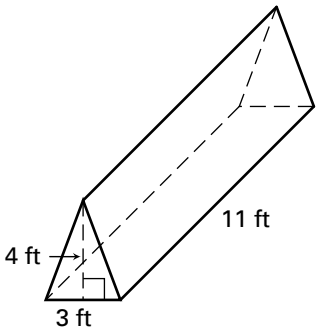
3. Find the perimeter of the trapezoid after multiplying its dimensions by 6.



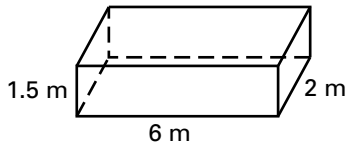
4. Find the area of the parallelogram after multiplying its dimensions by 1.5.



5. Find the area of a base of the triangular prism and the volume of the prism shown after multiplying its dimensions by 2.



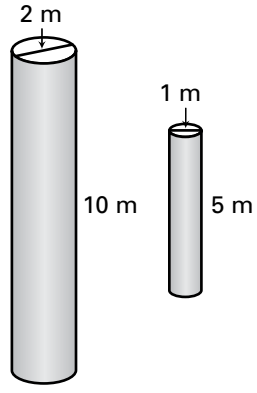
6. Find the area of a base of the rectangular prism and the volume of the prism shown after multiplying its dimensions by 3.



7. A small cylinder has a height of 5 meters and a diameter of 1 meter. A large cylinder has a height of 10 meters and a diameter of 2 meters.

a. How does the area of the base of the larger cylinder compare with the area of the base of the smaller cylinder?

b. How does the volume of the larger cylinder compare with the volume of the smaller cylinder?



8. **Challenge** The volume of a house is 2744 times the volume of one of its closets. The interior length, width, and height of the house are 40 feet, 32 feet, and 72 feet, respectively. If the closet is similar to the house, what are the approximate dimensions of the closet? Round to the nearest hundredth.

LESSON 11.1

Name _____ Date _____

Practice

For use with pages 611–617

Make an ordered stem-and-leaf plot of the data.

1. 16.9, 17.8, 16.3, 16.4, 17.8, 18.1, 15.4, 16.8, 17.1, 18.3, 15.5, 16.2, 17.9

2. 96.9, 92.5, 94.7, 98.4, 92.1, 94.8, 96.4, 97.5, 97.2, 96.8, 97.7, 97.6, 93.0, 94.6, 97.2, 97.8, 94.3, 97.7

3. 282, 274, 250, 291, 286, 249, 289, 288, 251, 261, 272, 268, 247, 263, 248, 267, 295, 287

4. 737, 784, 753, 762, 771, 756, 754, 739, 757, 762, 775, 758, 759, 786, 755, 778, 756, 778, 758

In Exercises 5–8, use the data to make a frequency table and a histogram.

5. 20, 4, 6, 9, 14, 15, 20, 23, 21, 7, 4, 12, 10, 5

6. 24, 42, 44, 39, 21, 30, 31, 35, 33, 30, 34, 36, 34, 37, 33, 38, 22

7. 5300, 3800, 1000, 1900, 2100, 2600, 3100, 5400, 1800, 1600, 2300, 2400, 1700, 2900, 2400, 2200, 5700, 1200, 2300, 2100

8. 281, 241, 267, 290, 283, 281, 282, 284, 262, 271, 274, 285, 261, 284, 283, 280, 275

9. The ages of 30 people who participate in a contest are as follows: 23, 25, 37, 44, 48, 39, 33, 27, 28, 41, 19, 18, 22, 29, 35, 46, 47, 31, 30, 20, 34, 37, 41, 45, 25, 28, 34, 45, 40, 18.

a. Make an ordered stem-and-leaf plot of the data.

b. Find the median and range of the data.

Make a histogram from the stem-and-leaf plot. Do not use the same intervals in your histogram as are used in the stem-and-leaf plot.

10.

19	1 2 3 4
20	1 2 5 6 7 8 9
21	0 3 4 6 7 7
22	0 0 3 9 9

Key: 22 | 3 = 22.3

11.

58	1 2 3 3 4 5
59	0 2 4 5 5 6 7 7 8 8 8
60	7 9
61	1 1 3 5 9

Key: 58 | 1 = 581

12. The results of the top ten distances (in meters) for men and women in a long jump competition are listed below.

Women: 5.20, 5.08, 4.64, 5.76, 5.62, 5.06, 4.75, 4.98, 4.70, 4.76

Men: 6.39, 6.56, 6.80, 6.97, 6.70, 6.68, 6.50, 6.57, 6.67, 6.59

a. Make frequency tables for both the men's and women's distances.

b. Use the frequency tables you made in part (a) to make histograms for the two sets of data.

c. What conclusions can you make from the distributions of the data?

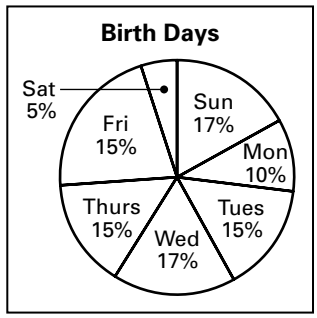
FOCUS ON 11.1

Name _____ Date _____

Practice

For use with pages 618–619

In Exercises 1-5, use the circle graph, which shows the results of a survey that asked 200 people on which day of the week they were born.



1. How many people were born on a Monday?
2. How many people were born on a Friday?
3. How many people were born on Tuesday or Thursday?
4. What percent of people were born on a weekend?
5. What percent of people were born on Wednesday?

Display the data in a circle graph.

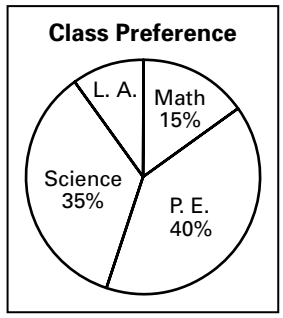
6.

Favorite Fruit	Percent
apple	15%
banana	25%
orange	30%
kiwi	10%
pineapple	20%

7.

Favorite Type of Book	Percent
romance	23.3%
mystery	33.0%
horror	27.2%
biography	4.4%
other	12.1%

8. **Class Preference** You take a survey of 40 classmates to find their favorite subject in school. You discover 15% prefer math, 40% prefer physical education, 35% prefer science, and the rest prefer language arts. Tell how many students prefer each type of subject.



9. **Challenge** A survey was taken of 300 people. Given a choice of Florida cities, one quarter of the survey participants chose Tallahassee as their favorite city. The number of people who chose Miami as their favorite city was two-thirds of the number who chose Tallahassee. The number of people who chose Orlando was three times the number who chose Miami. The remaining people chose other cities as their favorite. Display the data in a circle graph, and tell how many people chose Tallahassee, Miami, Orlando, and other cities.

LESSON 11.2

Name _____ Date _____

Practice

For use with pages 620–624

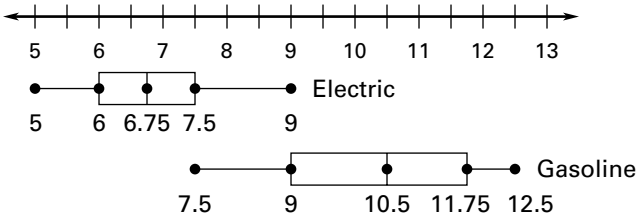
Complete the statement.

1. The interquartile range of a data set is the __?__ of the __?__ quartile and the __?__ quartile.
2. In a box-and-whisker plot, the entire box represents about __?__% of the data.
3. In a box-and-whisker plot, one whisker represents about __?__% of the data.

Make a box-and-whisker plot of the data.

4. School days missed: 0, 4, 7, 2, 5, 9, 11, 3
5. Fuel economy of small sedans (in miles per gallon): 51, 41, 38, 42, 35, 32, 29, 30
6. Shoe prices (in dollars): 10, 20, 18, 8, 13, 15, 11, 16, 14, 20, 25, 17, 30
7. Battery life in laptop computers (in hours): 5, 3.75, 4.75, 2.75, 3, 5.5, 4, 3.5

The box-and-whisker plots show the weights of electric handheld power blowers and gasoline handheld power blowers.



8. Compare the median, range, and interquartile range for the two types of blowers.
9. About what percent of the electric blowers are less than 7.5 pounds? About what percent of the gasoline blowers are more than 10.5 pounds?
10. Which type of blower would you say is the "lighter" blower? Explain.

In Exercises 11–13, use the following information. An outlier is a data value whose distance from the upper or lower quartile is more than 1.5 times the interquartile range.

11. Make a box-and-whisker plot for the following data (snowfall, in inches, of the top ten snowiest cities in the U.S. in a recent year): 100, 129, 105, 97, 112, 103, 241, 110, 117, 98.
12. Determine if there are any outliers in the snowfall data set. Make a box-and-whisker plot for the data, excluding any outliers.
13. What conclusion(s) can you make from the plot in Exercise 12 that you would not make from the plot in Exercise 11?

FOCUS ON 11.2

Name _____ Date _____

Practice

For use with pages 626–627

1. **Test Scores** The data below are a student's test scores in math class.

   91, 87, 87, 93, 95, 86, 91

   a. Find the mean, median, and mode of the data.

   b. Find the mean, median, and mode of the data after the two lowest scores are removed.

2. **T-Shirts** The data below are the costs of different types of T-shirts at a clothing store.

   $7.95, $9.95, $6.95, $12.95, $14.95, $12.95, $12.95, $9.95

   a. Find the mean, median, and mode of the data.

   b. Find the mean, median, and mode after a decrease of $0.50 to the cost of each T-shirt. How do the mean, median, and mode change?

3. **Practicing Music** The data below are the number of hours that students in a music class practice their musical instrument each week.

   8, 7, 5, 7, 3, 5, 6, 4

   a. Find the mean, median, and mode of the data.

   b. Suppose a new student who practices the drums for 7 hours a week joins the music class. How does adding this data value change the mean, median, and mode?

   c. Suppose the two students who practice 5 hours a week start practicing an extra hour each week to prepare for a concert. How does adding this extra hour change the mean, median, and mode?

4. **Books** The data below are the costs of different paperback books at a bookstore.

   $7.25, $6.95, $5.95, $7.95, $8.50, $9.50

   a. Find the mean, median, and mode of the data.

   b. The store marks up the price of each book by $2. Find the mean, median, and mode of the data including the markup.

   c. The store is having a 25% off sale on all paperback books. Find the mean, median, and mode of the sale priced data.

5. **Challenge** The data below are the costs of different school supplies at a school store.

   $0.95, $1.50, $0.59 $3.50, $7, $5.50, $1.50, $6.50

   a. Find the mean, median, and mode of the data.

   b. Suppose the store marks up the price of each item under $5.00 by $0.25 and reduces the price of each item over $5.00 by $0.75. Find the mean, median, and mode of the marked-up and discounted data.

   c. Suppose the store discounts all items that cost $3 or more by 40%. Find the mean, median, and mode of the discounted data.

LESSON 11.3

Name _____ Date _____

Practice

For use with pages 630–634

Tell whether the data are *numerical* or *categorical*. Then tell which display(s) you would use to display the data. Explain your reasoning.

1. A survey was conducted where the responses were agree, disagree, and unsure.

2. A zookeeper recorded the weights of the baby animals in the zoo.

3. A study determined the average winning score of high school soccer teams.

4. A meteorologist recorded the amount of rainfall in 3 states over one year.

Tell which data display(s) allow you to identify the specified information.

5. The range of the data set

6. The least value of the data set

7. A teacher records the scores on a project and wants to group the data in intervals of 5 points. Should the teacher use a stem-and-leaf plot or a histogram? Explain.

8. Thirty people were asked to state the number of hours per week that they commute to and from work in a car. The frequency table shows the results.

a. Is the frequency table misleading? Explain.

b. What conclusions can you make from the frequency table?

Hours Spent Commuting		
Interval	**Tally**	**Frequency**
0–2 hours	IIII	4
3–5 hours	𝍸 I	6
6–10 hours	𝍸 𝍸 𝍸	15
11–12 hours	III	3
13–20 hours	II	2

9. The table shows the number of people (in thousands) attending a tennis tournament in 10 different years.

a. Make a line graph using every 5th year, starting with 1980. What trend does the graph show?

b. Make a new line graph using all the years shown in the table. What trend does it show?

c. Which line graph represents the data more accurately, the one in part (a) or the one in part (b)? Explain.

Tennis Tournament Attendance			
Year	**Attendance**	**Year**	**Attendance**
1980	12.3	1990	17.3
1981	14.1	1992	20.1
1982	20.2	1995	15.9
1985	19.6	1999	21.0
1988	18.4	2000	18.5

FOCUS ON

11.3 Practice

Name _____ Date _____

For use with pages 634A-634B

Find the mean and mean absolute deviation of the data.

1. 47, 52, 50, 54, 49, 45, 49, 50
2. 50, 101, 43, 116, 85, 73, 134, 125, 110, 98
3. 85, 87, 88, 89, 90, 92, 94, 95
4. 1, 4, 8, 7, 7, 2, 11, 5, 8, 7, 6, 8, 8, 5, 9
5. 49, 44, 50, 51, 47, 50, 48, 53
6. 15, 90, 54, 81, 66, 52, 73, 22, 28, 96
7. **Hockey** The following data are the total NHL goals scored in the 2009–2010 season for the top 10 players for each team.

   Carolina Hurricanes: 30, 29, 21, 21, 14, 14, 11, 11, 9, 8
   Chicago Blackhawks: 30, 25, 25, 24, 22, 20, 17, 17, 14, 10

   a. Make a line plot and estimate the mean of each data set. Compare the distributions.

   b. Find the mean and mean absolute deviation of each data set. Compare the results.

8. **Challenge** Consider the following data set: 13, 15, 17, 18, 19, 22, 22, 24, 25, 25.

   a. Change some of the values in the data set so that the mean and range stay the same, but the mean absolute deviation gets larger. Explain your reasoning.

   b. Change some of the values in the data set so that the mean and range stay the same, but the mean absolute deviation gets smaller. Explain your reasoning.

LESSON 11.4

Name _____ Date _____

Practice

For use with pages 635–639

A newspaper is conducting a survey to predict who will win the next mayoral election. Tell whether the sampling method is *random*, *systematic*, *stratified*, *convenience*, or *self-selected*.

1. Set up a phone number where people can call in their opinion.
2. Call every 100th person in the phone book.
3. Interview every fifth person that leaves a grocery store.
4. Interview 10 people from each neighborhood.

In Exercises 5 and 6, describe the population and tell what type of sampling method is used. Then tell whether the sample is likely to represent the population. Explain your answer.

5. A researcher wants to know the opinions that people in a state have about home computers. The researcher asks every third customer who enters a computer store in a mall whether they approve or disapprove of computers at home.
6. A writer for a newspaper wants to determine the most popular non-fiction book among residents in a town. The writer asks every other person leaving the local library what their favorite non-fiction book is.
7. A speaker at a seminar wants to know how well a speech was received by members of the audience. The speaker leaves the form shown on a table for members of the audience to complete after the speech.
   a. Describe the population and the sampling method.
   b. Is the questionnaire likely to represent the population? Explain why or why not.

1. Was the information communicated effectively?

2. What did you enjoy most about the speaker?

3. What did you enjoy least about the speaker?

In Exercises 8–10, tell whether the question is potentially biased. Explain your answer. If the question is biased, rewrite it so that it is not.

8. Do you support building an expensive new stadium while the old one is perfectly usable?
9. How many times a week do you exercise?
10. Don't you think our town should have a fun new park?
11. Researchers conducted a study to determine the average age of the people living in a city. They did so by recording the age of 200 people in the city. Tell whether the following statements, if true, would lower your confidence in the results of the study. Explain your answers.
    a. The researchers chose the people in their sample randomly.
    b. The researchers selected people only from the eastern portion of the city.
    c. Some of the people in the study were much older than others.

LESSON 11.5

Name _____ Date _____

Practice

For use with pages 643–647

1. A survey of 300 randomly selected new parents finds that 99 new parents prefer brand A baby food. Predict how many new parents in a town of 2500 new parents prefer brand A baby food.

2. You interview a random sample of 100 residents in a town. Forty-two people say that raspberry is their favorite muffin flavor. There are 3000 people in the town. Predict how many people in the town would say that raspberry is their favorite muffin flavor.

3. Four surveys based on random samples of students in a school were conducted before a school student council election. The results are shown in the table along with the margin of error for each survey. For each election, predict a winner or tell whether the election is too close to call.

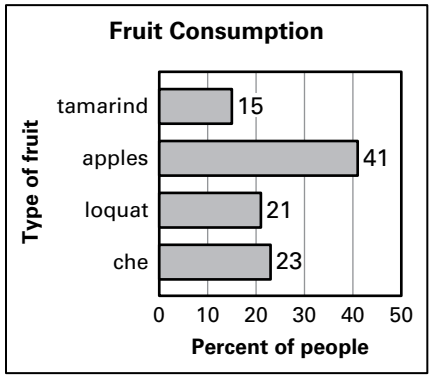
Position	Leading Candidate	Trailing Candidate	Margin of Error
President	52%	48%	±4%
Vice President	55%	45%	±4%
Secretary	51%	49%	±5%
Treasurer	53.5%	46.5%	±3%

4. A politician needs 750 signatures from people in town to run for office. You interview a random sample of 100 people in town. You find that 38 people say they would provide their signature. The town has 3200 people. Do you think enough people will provide their signatures? Justify your reasoning.

5. Review the newspaper article below which summarizes the results of a survey. How much trust do you have in the survey? Do you think the conclusions in the article are valid? Explain.

Tamarind, Che, and Loquat Becoming Common Fruits!

A recent survey of 150 people at the local market found more people in town eat tamarind, che, and loquat than eat traditional fruits, such as apples. The survey was conducted by Frank's Fruit Stand, a fruit seller who specializes in unusual fruit.



6. A town has 2500 residents. A survey finds that 92 residents out of a random sample of 575 residents have a red car. The margin of error for the survey is ±4%. Find the interval in which the total number of residents with a red car is most likely to lie.

LESSON 11.5

Name _____ Date _____

Practice

For use with pages 647A–647B

1. The two-way table shows the results of a survey that asked high school seniors if they plan to attend senior prom.

	Response	
Gender	Yes	No
Male	58	42
Females	115	35

a. How many of those surveyed are female and plan to attend prom?

b. How many males were surveyed?

2. The two-way table shows the results of a survey that asked high school students how they get to school every morning.

	Class			
Response	**Freshmen**	**Sophomores**	**Juniors**	**Seniors**
Bus	82	52	20	11
Walk	25	17	8	5
Car	23	81	92	84

a. How many juniors take a car to school?

b. How many students that walk to school are freshmen?

c. Find and interpret the sum of each row and column in the two-way table.

3. **Survey** You randomly survey a group of elementary school students asking if they have siblings. The results are shown.

3rd graders: 15 have no siblings, 8 have one, 27 have more than one

4th graders: 18 have no siblings, 12 have one, 20 have more than one

5th graders: 10 have no siblings, 29 have one, 11 have more than one

a. Construct a two-way table. Include the row and column totals.

b. For each grade level, what percent of students have zero, have one, or have more than one sibling? Arrange the results in a two-way table.

4. **Challenge** 150 men and 250 women were asked in a survey "Do you subscribe to at least one magazine?" 16% of the men said yes and 42% of the women said no.

a. Of the people who took this survey, how many women do subscribe to at least one magazine?

b. How many people who do not subscribe to at least one magazine are men?

c. What percent of the total people who took this survey do subscribe to at least one magazine?

d. If you sell magazine subscriptions, which group of people would you target? Explain.

FOCUS ON **11.5**

Name _____ Date _____

Practice

For use with pages 647C–647D

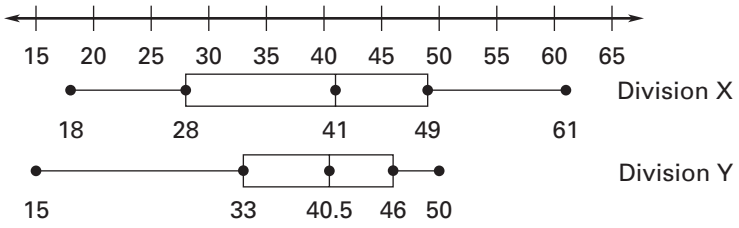
1. Grades The table shows the grades (in percentages) of two students for 11 randomly selected biology assignments. Use a measure of central tendency to draw a conclusion about the data. Explain your reasoning.

Student A	84	82	73	91	58	80	73	90	78	75	94
Student B	88	86	90	88	70	78	77	88	80	75	96

2. Grocery store The table shows the prices (in dollars) for 8 randomly selected items in two grocery stores. Use a measure of central tendency to draw a conclusion about the data. Explain your reasoning.

Store A	1.29	3.59	4.68	2.35	2.00	8.49	1.87	1.99
Store B	0.99	3.00	4.59	2.50	1.75	8.29	2.00	1.89

3. Business The box-and-whisker plots show the monthly sales (in thousands of dollars) within two divisions of a company. The table shows the data that are represented by the box-and-whisker plots.



Division X	22	18	26	36	45	30	37	47	46	51	53	61
Division Y	30	15	27	37	40	36	41	45	42	47	49	50

a. Use a measure of central tendency to draw a conclusion about the data. Explain your reasoning.

b. Use a measure of dispersion to draw a conclusion about the data. Explain your reasoning.

4. Challenge A juice company is planning to launch a new flavor. The table shows the results of a taste test of 20 random consumers. Each consumer rated three different flavors using a scale from 1 (did not like) to 10 (liked very much).

Very Cherry	2	5	3	7	5	2	2	1	5	6	3	7	7	3	4	1	4	7	8	4
Orange Mango	5	3	6	3	9	10	7	3	3	8	4	7	2	6	6	4	6	3	7	8
Berry Grape	10	7	9	6	10	8	5	5	9	4	8	5	5	5	8	9	3	4	5	3

Use a measure of central tendency to decide which juice flavor will win the taste test. Explain your reasoning.

LESSON 11.6

Name _____ Date _____

Practice

For use with pages 649–653

1. List all the permutations of the numbers 1, 2, and 3.

2. 6! = __?__ • __?__ • __?__ • __?__ • __?__ • __?__

Match the expression with its value

3. 4!

4. ${}_4P_1$

5. 0!

6. ${}_4P_2$

A. 1

B. 12

C. 4

D. 24

Evaluate the factorial.

7. $(4 - 1)!$

8. $(10 - 4)!$

9. $(17 - 12)!$

10. $(12 - 4)!$

Find the number of permutations.

11. ${}_5P_0$

12. ${}_6P_2$

13. ${}_{20}P_1$

14. ${}_7P_3$

15. ${}_7P_7$

16. ${}_8P_4$

17. ${}_{21}P_3$

18. ${}_{14}P_6$

Write the expression using factorials.

19. 21 • 20 • 19

20. 45

21. 11 • 10 • 9 • 8 • 7 • 6 • 5 • 4

22. 53 • 52 • 51 • 50

23. Ten cyclists enter a race. In how many ways can they finish first, second, and third?

24. A company's security system uses a code consisting of 5 different digits. Your security code has the digits 8, 2, 9, 0, and 3, but you don't remember the order in which the 5 digits are to be entered. Find the probability that you enter the correct code on the first try.

25. In how many ways can 5 children line up in one row to have their picture taken?

26. You have 12 CDs and choose 4 of them to play one evening. How many orders of CDs are possible for playing the 4 CDs?

LESSON 11.7

Name _____ Date _____

Practice

For use with pages 654–659

1. To find the number of combinations of n objects taken r at a time, divide the number of __?__ of n objects taken r at a time by __?__.

Find the number of combinations.

2. ${}_4C_1$ **3.** ${}_3C_3$ **4.** ${}_5C_3$ **5.** ${}_7C_2$

6. ${}_9C_8$ **7.** ${}_{14}C_0$ **8.** ${}_{12}C_4$ **9.** ${}_{13}C_{12}$

10. ${}_8C_6$ **11.** ${}_9C_3$ **12.** ${}_{15}C_2$ **13.** ${}_{14}C_{10}$

In Exercises 14–16, tell whether the possibilities can be counted using *permutations* or *combinations*. Then answer the question.

14. A media research firm conducts a survey of television viewers and asks them to state their favorite show and least favorite show from a list of 15 shows. How many possible responses are there?

15. The manager of an engineering department wants to form a three-person advisory committee from the 18 employees in the department. How many different groups can the manager form?

16. There are 4 processes involved in assembling a certain product. These processes can be performed in any order. Management wants to find which order is the least time consuming. How many orders will have to be tested?

17. A company wants to send 3 of its 10 sales representatives to a conference. How many different groups can the company choose?

18. A state government is planning a new section of highway and has received bids from 16 construction companies. The state needs 5 of the companies. How many different groups of 5 companies can the state choose?

19. A jury consists of 8 men and 4 women. Four jurors are selected at random for an interview. How many different groups of 4 jurors are there? Find the probability that all 4 jurors chosen are women.

LESSON 11.8

Name _____ Date _____

Practice

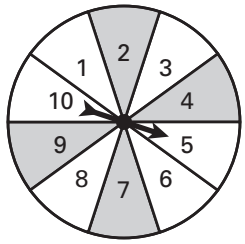
For use with pages 661–666

Complete the statement.

1. If A and B are disjoint events, then $P(\text{A or B}) =$ ___?___.
2. If A and B are overlapping events, then $P(\text{A or B}) =$ ___?___.
3. The sum of the probabilities of complementary events is always ___?___.
4. If you know the probability of an event A, then the probability of the complementary event, *not* A, is given by $P(\text{not A}) =$ ___?___.

The spinner is divided into equal parts. For the specified events A and B, tell whether the events are *disjoint* or *overlapping*. Then find *P*(A or B).

5. **Event A:** Stops on an even number.
   Event B: Stops on a shaded sector.
6. **Event A:** Stops on a shaded sector.
   Event B: Stops on a multiple of 5.



Events A and B are disjoint. Find *P*(A or B).

7. $P(\text{A}) = \frac{3}{14}$, $P(\text{B}) = \frac{9}{14}$
8. $P(\text{A}) = \frac{11}{42}$, $P(\text{B}) = \frac{13}{42}$

Events A and B are overlapping. Find *P*(A or B).

9. $P(\text{A}) = \frac{7}{20}$, $P(\text{B}) = \frac{9}{20}$, $P(\text{A and B}) = \frac{3}{20}$
10. $P(\text{A}) = \frac{1}{4}$, $P(\text{B}) = \frac{1}{3}$, $P(\text{A and B}) = \frac{5}{24}$

Given *P*(A), find *P*(not A).

11. $P(\text{A}) = 27\%$
12. $P(\text{A}) = 89\%$
13. $P(\text{A}) = \frac{9}{26}$
14. $P(\text{A}) = \frac{13}{41}$

In Exercises 15–17, use the following information. At a college, 51% of the students are women, 25% of the students are business majors, 5% have not chosen a major, and 12% are women and business majors. A student newspaper conducts a poll and selects students at random to answer a survey.

15. What is the probability that a randomly selected student will be either a woman or a business major?
16. What is the probability that a randomly selected student is not a business major?
17. What is the probability that a randomly selected student is either a business major or has not chosen a major?

LESSON 11.9

Name _____ Date _____

Practice

For use with pages 668–673

Complete the statement.

1. If A and B are independent events, then $P(\text{A and B}) =$ __?__.

2. If A and B are dependent events, then $P(\text{A and B}) =$ __?__.

Events A and B are independent. Find the missing probability.

3. $P(\text{A}) = \frac{2}{5}$

$P(\text{B}) = \frac{1}{6}$

$P(\text{A and B}) =$ __?__

4. $P(\text{A}) = \frac{3}{8}$

$P(\text{B}) = \frac{4}{9}$

$P(\text{A and B}) =$ __?__

Events A and B are dependent. Find the missing probability.

5. $P(\text{A}) = \frac{6}{11}$

$P(\text{B given A}) = \frac{1}{2}$

$P(\text{A and B}) =$ __?__

6. $P(\text{A}) = \frac{8}{15}$

$P(\text{B given A}) = \frac{5}{14}$

$P(\text{A and B}) =$ __?__

In Exercises 7 and 8, tell whether the events are *independent* or *dependent*. Then find *P*(A and B).

7. You randomly choose a marble from a bag of 8 green marbles and 5 blue marbles. You randomly draw another marble without replacing the first marble.

Event A: You draw a blue marble.

Event B: You draw a blue marble.

8. A weather forecaster says that there is a 25% chance of rain today and a 55% chance of rain tomorrow.

Event A: It rains today.

Event B: It rains tomorrow.

9. Each week you have a surprise quiz in your social studies and science classes. Find the probability that both quizzes will be given on the same day next week.

10. A printing company's bookbinding machine has a probability of 0.5% of producing a defective book. If this machine is used to bind 3 books, find the probability that none of the books are defective. Round your answer to the nearest tenth of a percent.

11. Twelve light bulbs are tested to see if they last as long as the manufacturer claims they do. Three light bulbs fail the test. Two light bulbs are selected at random without replacement.

a. Find the probability that both light bulbs failed the test.

b. Which is greater, the probability that the first light bulb passed the test and the second one failed or the probability that the first light bulb failed the test and the second one passed?

LESSON 12.1

Name _____ Date _____

Practice

For use with pages 687–691

Tell whether the angles are *complementary*, *supplementary*, or *neither*.

1. $m\angle 1 = 26.5°$
$m\angle 2 = 63.5°$

2. $m\angle 3 = 108.2°$
$m\angle 4 = 61.8°$

3. $m\angle 5 = 32.1°$
$m\angle 6 = 67.9°$

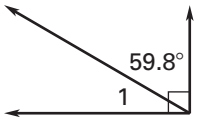
4. $m\angle 7 = 98.7°$
$m\angle 8 = 81.3°$

5. $m\angle 9 = 41.2°$
$m\angle 10 = 58.8°$

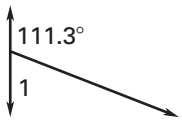
6. $m\angle 11 = 27.5°$
$m\angle 12 = 152.5°$

Find $m\angle 1$.

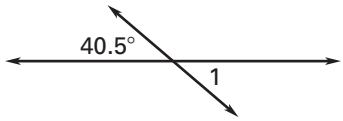
7.



8.

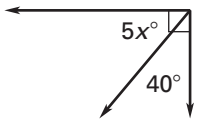


9.

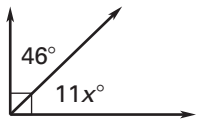


Find the value of x. Then find the unknown angle measure.

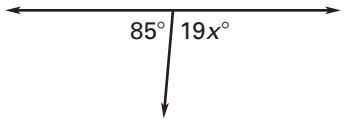
10.



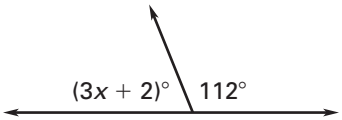
11.



12.



13.



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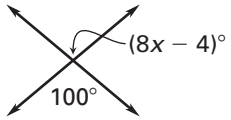
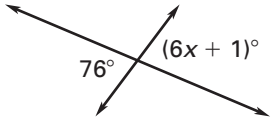


15.



Use the given information to find $m\angle 2$.

16. $\angle 1$ and $\angle 2$ are complementary angles, and $m\angle 1 = 19.5°$.

17. $\angle 1$ and $\angle 2$ are supplementary angles, and $m\angle 1 = 87.9°$.

18. $\angle 1$ and $\angle 2$ are vertical angles, and $m\angle 1 = 45.6°$.

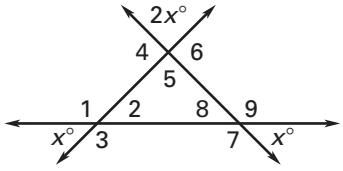
In the diagram, write an expression in terms of x for the indicated angle.

19. $m\angle 1$

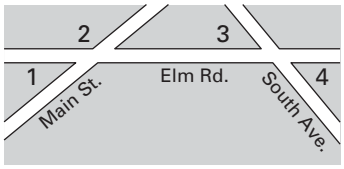
20. $m\angle 4$

21. $m\angle 5$

22. $m\angle 8$



23. On the map, Elm Road intersects both Main Street and South Avenue. $\angle 1$ and $\angle 3$ are complementary angles and $m\angle 2 = 140.5°$. Find $m\angle 1$, $m\angle 3$, and $m\angle 4$.



Lesson 12.1

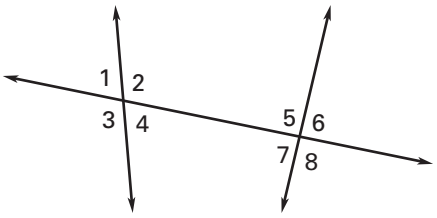
LESSON 12.2

Name _____ Date _____

Practice

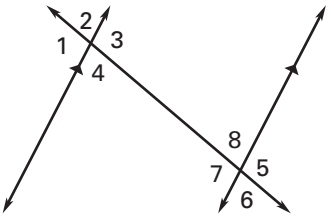
For use with pages 692–696

In Exercises 1–3, use the diagram at the right.



1. Name all pairs of corresponding angles.
2. Name all pairs of alternate interior angles.
3. Name all pairs of alternate exterior angles.

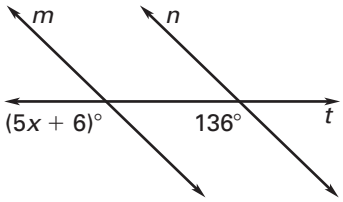
In Exercises 4–6, use the diagram at the right.



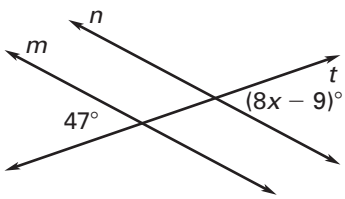
4. Name all angles that have the same measure as $\angle 1$.
5. Name all angles that have the same measure as $\angle 2$.
6. If $m\angle 1 = 77°$, find the measures of the other numbered angles in the diagram.

Find the value of *x* that makes lines *m* and *n* parallel.

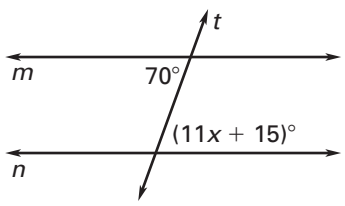
7.



8.

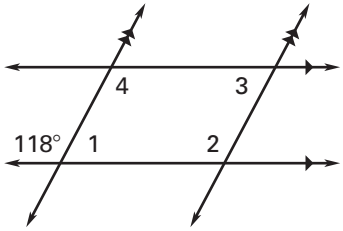


9.

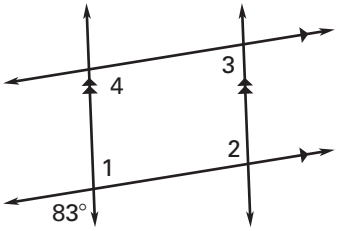


Find the measures of the numbered angles in the diagram.

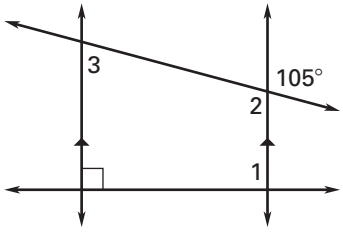
10.



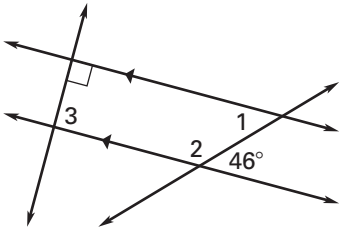
11.



12.



13.



14. A transversal intersects two parallel lines, forming alternate exterior angles $\angle 1$ and $\angle 2$ and corresponding angles $\angle 1$ and $\angle 3$. Illustrate the situation. How are $\angle 2$ and $\angle 3$ related? How are $m\angle 2$ and $m\angle 3$ related? Explain.

Lesson 12.2

LESSON 12.3

Name _____ Date _____

Practice

For use with pages 697–703

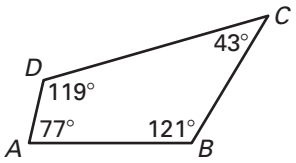
In Exercises 1–3, find the measure of an interior angle and the measure of an exterior angle for the regular polygon.

1. 9-gon

2. 12-gon

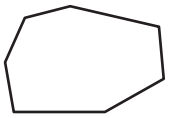
3. 15-gon

4. For the quadrilateral shown, what is the measure of an exterior angle at vertex A? at vertex B? at vertex C? at vertex D?

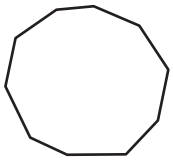


Find the sum of the measures of the interior angles of the polygon.

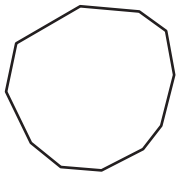
5.



6.

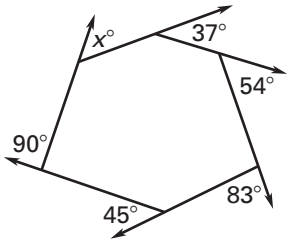


7.

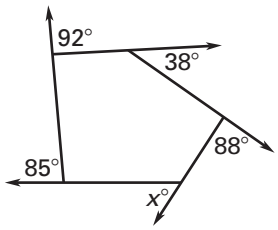


In Exercises 8 and 9, find the unknown angle measure.

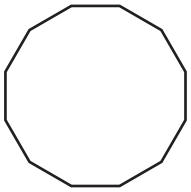
8.



9.

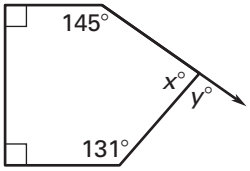


10. The diagram shows the base of the Bellville Turnverein Pavilion. The base of the pavilion is a 12-gon. What is the sum of the measures of the interior angles of the base?

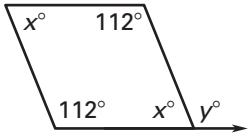


In Exercises 11–13, find the values of x and y.

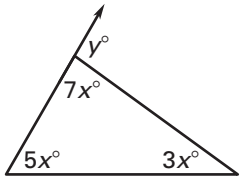
11.



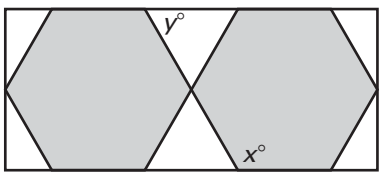
12.



13.



14. The stained glass window is made with polygons. Each shaded figure is a regular polygon. Find the values of x and y.



Lesson 12.3

LESSON 12.4

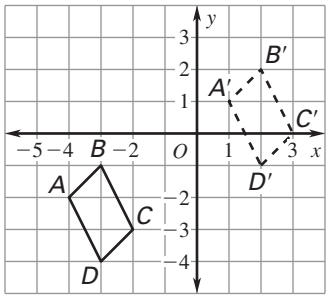
Name _____ Date _____

Practice

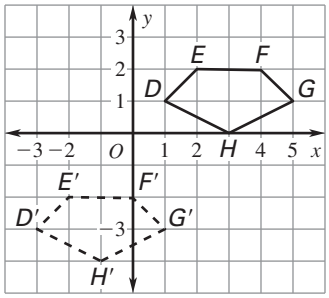
For use with pages 705–709

Describe the translation from the solid figure to the dashed figure in words.

1.



2.



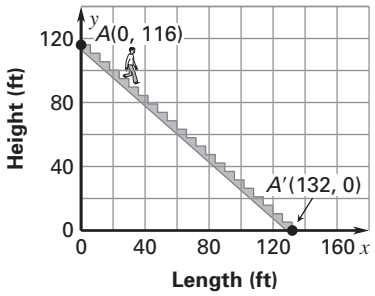
Draw the polygon with the given vertices. Predict where in the coordinate plane its image will lie after the specified translation. Then find the coordinates of the vertices, and draw the image.

3. $J(4, 2)$, $K(7, 2)$, $L(7, 0)$, $M(5, 0)$; $(x, y) \longrightarrow (x - 6, y + 5)$

4. $Q(2, -4)$, $R(4, -3)$, $S(4, -5)$, $T(2, -7)$, $U(1, -6)$; $(x, y) \longrightarrow (x - 5, y + 2)$

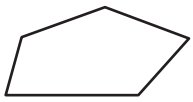
5. $A(-4, 2)$, $B(-2, 5)$, $C(0, 3)$, $D(0, 0)$, $E(-2, 0)$; $(x, y) \longrightarrow (x + 4, y)$

6. The person in the diagram walks down the stairs. Describe the change in the position after the person walks down the stairs.

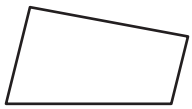


Tell whether you can create a tessellation using only translations of the given polygon. If you can, create a tessellation. If not, explain why not.

7.



8.



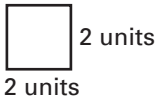
9.

Copy the rectangle. Use its dimensions to draw the image of the rectangle after the given translation.

10. 2 units to the left

11. 2 units up

12. 4 units to the right and 2 units up



Lesson 12.4

LESSON 12.5

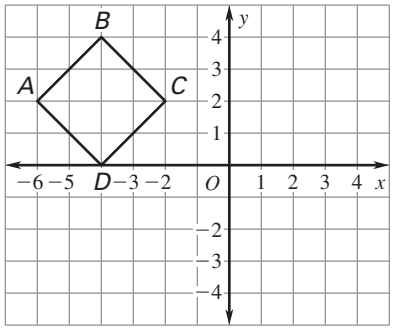
Name _____ Date _____

Practice

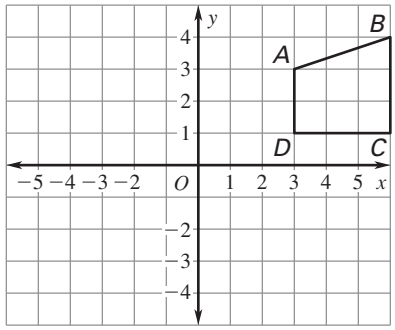
For use with pages 709–713

Draw the polygon shown. Then find the coordinates of the vertices of the final image after the specified transformations, and draw the final image.

1. Reflect the polygon in the x-axis, then translate the image using $(x, y) \rightarrow (x + 5, y + 5)$.



2. Reflect the polygon in the y-axis, then translate the image using $(x, y) \rightarrow (x + 4, y - 4)$.



Copy $\triangle ABC$. Then draw the image of $\triangle ABC$ after reflection in the given line.

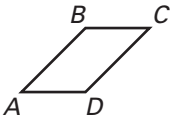
3. $\overleftrightarrow{BC}$

4. $\overleftrightarrow{AC}$

Copy polygon *ABCD*. Then draw the image of *ABCD* after reflection in the given line.

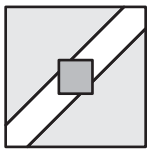
5. BC

6. AD

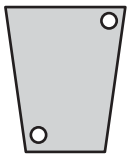


Tell how many lines of symmetry the figure has.

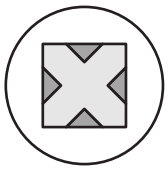
7.



8.



9.



LESSON 12.6

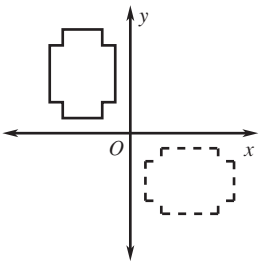
Name _____ Date _____

Practice

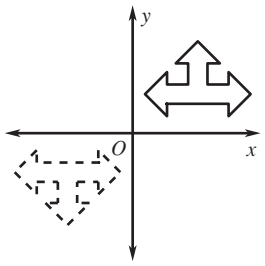
For use with pages 716–722

Tell whether the transformation is a rotation about the origin. If so, give the angle and direction of rotation.

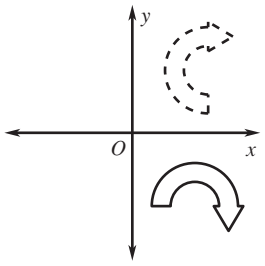
1.



2.



3.



Draw the polygon with the given vertices. Predict where in the coordinate plane its image will lie after the specified rotation. Then find the coordinates of the vertices, and draw the image.

4. $A(-6, 2)$, $B(-5, 4)$, $C(-2, 3)$, $D(-5, 1)$; 180° rotation

5. $J(0, 0)$, $K(0, 3)$, $L(4, 4)$, $M(5, 0)$; 90° clockwise rotation

6. $V(-6, -5)$, $W(-4, -2)$, $X(-1, 0)$, $Y(0, -2)$, $Z(-3, -3)$; 90° counterclockwise rotation

Copy the figure. Then draw the image of the figure after the given rotation around point *P*.

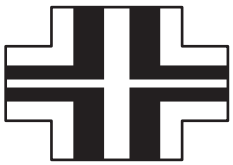
7. 90° clockwise

8. 90° counterclockwise

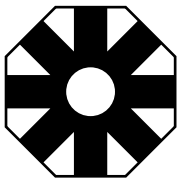
9. 180°

Tell whether the figure has rotational symmetry. If so, give each angle and direction of rotation that produce rotational symmetry.

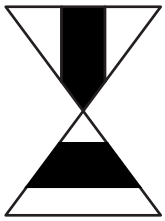
10.



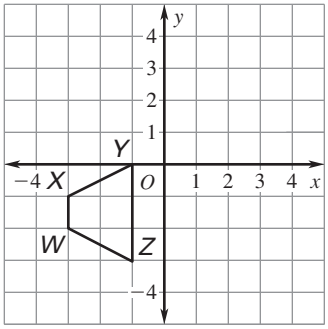
11.



12.



Draw the polygon shown. Then find the coordinates of the vertices of the final image after the specified transformations, and draw the final image.



13. Rotate the polygon 180°, then reflect the image in the x-axis.

14. Rotate the polygon 90° clockwise, then reflect the image in the y-axis.

15. Rotate the polygon 90° counterclockwise, then translate the image using $(x, y) \longrightarrow (x - 4, y + 3)$.

LESSON 12.7

Name _____ Date _____

Practice

For use with pages 723–727

Draw the polygon with the given vertices. Predict where in the coordinate plane its image will lie after the specified dilation. Then find the coordinates of the vertices, and draw the image.

1. $A(-2, -2)$, $B(-2, 2)$, $C(3, 4)$, $D(3, -2)$; $k = 1.5$

2. $W(-4, -6)$, $X(-4, 2)$, $Y(2, 0)$, $Z(4, -4)$; $k = \frac{5}{4}$

3. $J(2, 8)$, $K(2, -2)$, $L(6, 0)$, $M(8, 4)$, $N(6, 8)$; $k = 0.25$

4. $Q(0, 0)$, $R(0, -2.5)$, $S(-7.5, -7.5)$, $T(-12.5, -5)$, $U(-5, 0)$; $k = \frac{4}{5}$

5. Given $\overline{AB}$ with endpoints $A(0, 5)$ and $B(5, 5)$, let $\overline{A'B'}$ with endpoints $A'(0, 3)$ and $B'(3, 3)$ be the image of $\overline{AB}$ after a dilation. What is the scale factor of the dilation?

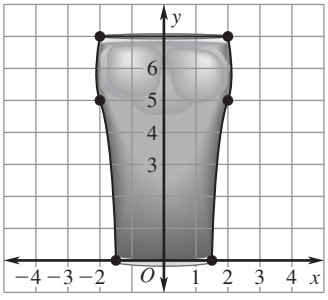
6. Given $\overline{FG}$ with endpoints $F(3, -2)$ and $G(3, 4)$, let $\overline{F'G'}$ with endpoints $F'(19.5, -13)$ and $G'(19.5, 26)$ be the image of $\overline{FG}$ after a dilation. What is the scale factor of the dilation?

In Exercises 7 and 8, draw the polygon with the given vertices. Predict where in the coordinate plane its final image will lie after the specified dilations having the specified scale factors. Then find the coordinates of the vertices, and draw the final image.

7. $\triangle DEF$ has vertices $D(-2, -1)$, $E(0, 2)$, and $F(2, -1)$. You dilate $\triangle DEF$ using a scale factor of 4, and then you dilate its image using a scale factor of 0.5.

8. Rectangle $ABCD$ has vertices $A(-4, -2)$, $B(-4, 4)$, $C(2, 4)$, and $D(2, -2)$. You dilate $ABCD$ using a scale factor of 1.5, and then you dilate its image using a scale factor of 1.5.

9. A restaurant offers four sizes of soft drinks—small, medium, large, and extra-large. The figure shows the medium-sized soft drink. Draw the outline of the figure. Then, on the same coordinate plane, draw the images of the outline after dilations having the scale factors $\frac{1}{2}$, $1\frac{1}{2}$, and 2, which represent the small, large, and extra-large sizes, respectively.



10. Draw $\triangle ABC$ with vertices $A(2, 1)$, $B(5, 1)$, and $C(5,4)$.

a. Find the coordinates of the vertices of the image after a dilation having a scale factor of -1.5, and draw the image.

b. Repeat part (a) using the absolute value of the scale factor.

c. Compare and contrast the images from part (a) and part (b). What do you notice?

Lesson 12.7