

Pre-requisite Skills for 8th Grade Algebra I

Directions: Use this packet as a guide to be sure you know how to do each type of problem. **Every problem does not have to be completed.** Answer pages are given after each section so that you can check your work. Turn this packet in **along with your scratch work** on the first day of eighth grade. Note that there are 7th Grade IXL categories for each concept, and you are welcome to do these for extra practice.

Integers and Algebraic Expressions (IXL categories B, C)

- Simplify expressions using the order of operations.
- Add, subtract, multiply, and divide integers.
- Simplify powers and the order of operations.

Equations and Inequalities (IXL categories R, S, T)

- Solve 1-step equations.
- Solve 2-step equations.
- Solve and graph 1-step inequalities.

Graphing (IXL category P)

- Graph ordered pairs on a coordinate plane.

Rational Numbers (IXL categories E, F, G, H)

- Add and subtract rational numbers.
- Multiply and divide rational numbers.
- Solve equations involving rational numbers.
- Add, subtract, multiply, and divide decimals.

Ratios, Rates, and Percents (IXL categories J, K, L, U)

- Find unit rates.
- Write ratios in simplest form.
- Fluently convert between fractions, decimals, and percents.
- Solve problems involving the percent of a number.

Reteaching 1-1**Algebraic Expressions and the Order of Operations**

A *variable* represents a number. An *algebraic expression* is formed from numbers, variables, and operations.

To evaluate an algebraic expression, substitute a number for each variable. Then follow the order of operations.

	Evaluate $4(n + 2)$ for $n = 3$.	Evaluate $n + 12 \div (3 \times m)$ for $n = 4$ and $m = 2$.
① Substitute for each variable.	$4(3 + 2)$	$4 + 12 \div (3 \times 2)$
② Work inside grouping symbols.	$= 4(5)$	$= 4 + 2 \div 6$
③ Multiply and divide from left to right.	$= 20$	$= 4 + 2$
④ Add and subtract from left to right.		$= 6$

Evaluate each expression for $g = 4$, $k = 2$, and $t = 9$.

1. $4t$

2. $3k$

3. $g + 4$

4. $5t + 7$

5. $4(g - 1)$

6. $15k + 6$

7. $3t - g$

8. $gt \div k$

9. $27 \div t \times k$

10. $g + 12 - 3 \times k$

11. $32 \div g \times k$

12. $(2t + 2) \div g$

13. $(20 \div g) \times k$

14. $4g + t - k$

15. $3(3g - t)$

16. $2g + 2 \times 3$

17. $kt - 3$

18. $10 + 4k \div 8$

19. The formula for the perimeter of a rectangle is $P = 2l + 2w$. If $l = 2$ in. and $w = 4$ in., what operation(s) would you do first?

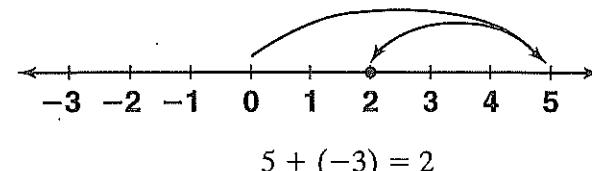
Reteaching 1-4

Adding and Subtracting Integers

A number line can help you add integers. For positive integers, move to the right. For negative integers, move to the left.

Example Add $5 + (-3)$:

First, move 5 spaces to the right.
Then move 3 spaces to the left.



- To add integers with the same sign, add absolute values and use the same sign.

$$3 + 5 = 8$$

$$-2 + -4 = -6$$

- To add integers with different signs, subtract absolute values and use the sign of the integer with the greater absolute value.

$$-7 + 3 = ?$$

$$|-7| - |3| = 7 - 3 = 4$$

Use the sign of -7 .

So, $-7 + 3 = -4$.

- To subtract an integer, add its opposite.

$$3 - (-2) = 3 + 2$$

The opposite of -2 is 2 .

$$= 5$$

$$3 - 4 = 3 + (-4) \quad \text{The opposite of } 4 \text{ is } -4.$$

$$= -1$$

$$-4 - (-5) = -4 + 5$$

The opposite of -5 is 5 .

$$= 1$$

Simplify each expression.

1. $8 + (-4) =$ _____

2. $8 + 4 =$ _____

3. $-8 + 4 =$ _____

4. $-3 + (-3) =$ _____

5. $6 + (-2) =$ _____

6. $11 + (-16) =$ _____

7. $-7 + 11 =$ _____

8. $-4 + 16 =$ _____

9. $8 + (-12) =$ _____

10. $-9 + (-10) =$ _____

11. $23 + (-3) =$ _____

12. $-5 + 2 =$ _____

13. $9 - (-3) =$ _____

14. $18 - 14 =$ _____

15. $-6 - 7 =$ _____

16. $-3 - (-3) =$ _____

17. $-4 - 16 =$ _____

18. $8 - (-9) =$ _____

19. $-3 - 12 =$ _____

20. $6 - (-2) =$ _____

21. $10 - (-16) =$ _____

22. $-9 - (-10) =$ _____

23. $2 - (-3) =$ _____

24. $-5 - 2 =$ _____

25. $12 - 32 =$ _____

26. $42 - (-15) =$ _____

27. $-16 - 23 =$ _____

28. You owe your teacher \$26 for the class trip. You give her a payment of \$11. How much do you still owe?

29. A golf ball is 6 inches under water. While trying to retrieve it, the golfer accidentally kicks it so that it descends another 9 inches. How far under the surface of the water is the golf ball?

Reteaching 1-5

Multiplying and Dividing Integers

- If two integers have the same sign, the product is positive.

$$8 \cdot 7 = 56 \quad (-8) \cdot (-7) = 56$$

- If two integers have opposite signs, the product is negative.

$$(-8) \cdot 7 = -56 \quad 8 \cdot (-7) = -56$$

- If two integers have the same sign, the quotient is positive.

$$8 \div 2 = 4 \quad (-8) \div (-2) = 4$$

- If two integers have opposite signs, the quotient is negative.

$$(-8) \div 2 = -4 \quad 8 \div (-2) = -4$$

Determine the sign of the product.

1. $-9 \cdot 3 = \boxed{} 27$

2. $80 \cdot (-2) = \boxed{} 160$

3. $-23 \cdot (-20) = \boxed{} 460$

4. $7 \cdot (-5) = \boxed{} 35$

5. $-6 \cdot (-8) = \boxed{} 48$

6. $64 \cdot 5 = \boxed{} 320$

Determine the sign of the quotient.

7. $24 \div (-3) = \boxed{} 8$

8. $-(24) \div (-2) = \boxed{} 12$

9. $-25 \div 5 = \boxed{} 5$

10. $-27 \div (-9) = \boxed{} 3$

11. $160 \div 4 = \boxed{} 40$

12. $90 \div (-30) = \boxed{} 3$

Simplify each expression.

13. $12 \cdot (-3)$

14. $-9 \cdot (-9)$

15. $9 \cdot (-1)$

16. $(-8) \cdot (-4)$

17. $5 \cdot 70$

18. $(-8) \cdot (-3)$

19. $-10 \cdot (-5)$

20. $-9 \cdot 8$

21. $4 \cdot 7$

22. $14 \cdot (-3)$

23. $-16 \cdot (-3)$

24. $5 \cdot (-25)$

25. $\frac{30}{5}$

26. $\frac{-72}{-8}$

27. $\frac{45}{-9}$

28. $-2 \div (-2)$

29. $6 \div (-1)$

30. $40 \div 2$

31. $48 \div (-12)$

32. $-99 \div (-9)$

33. $-21 \div 3$

34. $-33 \div 3$

35. $100 \div (-5)$

36. $75 \div (-3)$

Reteaching 1-7**Powers and Exponents**

Follow the order of operations when evaluating expressions with exponents.

Example 1 Evaluate $-(3 + 1)^2 + 5 \cdot 3^2$

$$\textcircled{1} \text{ Work inside grouping symbols first. } -(3 + 1)^2 + 5 \cdot 3^2 = -(4)^2 + 5 \cdot 3^2$$

$$\textcircled{2} \text{ Work with exponents. } = -16 + 5(9)$$

- To evaluate a power, write the factors and multiply.

$$5^4 = 5 \cdot 5 \cdot 5 \cdot 5 \quad (-2)^4 = (-2) \cdot (-2) \cdot (-2) \cdot (-2) \quad -2^4 = -(2 \cdot 2 \cdot 2 \cdot 2) \\ = 625 \quad = 16 \quad = -16$$

- To multiply numbers or variables with the same base, add the exponents.

$$\begin{array}{l} \text{Simplify. } 3^2 \cdot 3^4 \\ 3^2 \cdot 3^4 = 3^{(2+4)} \\ = 3^6 \end{array}$$

$$\begin{array}{l} \text{Simplify. } n^3 \cdot n^4 \\ n^3 \cdot n^4 = n^{(3+4)} \\ = n^7 \end{array}$$

$$\begin{array}{l} \text{Simplify. } -4^3 \cdot -4^5 \\ -4^3 \cdot -4^5 = 4^{(3+5)} \\ = 4^8 \end{array}$$

$$\textcircled{3} \text{ Multiply and divide from left to right. } = -16 + 45$$

$$\textcircled{4} \text{ Add and subtract from left to right. } = 29$$

To evaluate a variable expression with exponents, substitute a number for the variable and then evaluate as above.

Example 2 Evaluate $-2a^3$ for $a = 3$.

$$\begin{aligned} -2a^3 &= (-2)(3)^3 \\ &= (-2)(27) \\ &= -54 \end{aligned}$$

Write using exponents.

1. $7 \cdot 7 \cdot 7 = \underline{\hspace{2cm}}$

2. $(-6) \cdot (-6) \cdot (-6) \cdot (-6) \cdot (-6) = \underline{\hspace{2cm}}$

3. $10 \cdot 10 \cdot 10 \cdot 10 = \underline{\hspace{2cm}}$

4. $1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 = \underline{\hspace{2cm}}$

5. $(-8) \cdot (-8) \cdot (-8) \cdot (-8) \cdot (-8) = \underline{\hspace{2cm}} \quad 6. 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = \underline{\hspace{2cm}}$

Simplify each expression.

7. $3^2 + 7 \cdot 9 = \underline{\hspace{2cm}}$

8. $9 \cdot 3 - 2^3 = \underline{\hspace{2cm}}$

9. $2 + (10 - 3)^2 = \underline{\hspace{2cm}}$

10. $6 - 3^2 \cdot 4 = \underline{\hspace{2cm}}$

Evaluate each expression for the given values of the variables.

11. $m^2 - 6; m = 4 = \underline{\hspace{2cm}}$

12. $4c^3; c = 2 = \underline{\hspace{2cm}}$

13. $-2k^2 + 3; k = -5 = \underline{\hspace{2cm}}$

14. $2d^2 \div 6; d = 3 = \underline{\hspace{2cm}}$

15. $-2n^2 - 4; n = 4 = \underline{\hspace{2cm}}$

16. $3ab^2; a = -4, b = 2 = \underline{\hspace{2cm}}$

Chapter 1 Answers (continued)

Reteaching 1-1

1. 36 2. 6 3. 8 4. 52 5. 12
6. 36 7. 23 8. 18 9. 6 10. 10
11. 16 12. 5 13. 10 14. 23 15. 9
16. 14 17. 15 18. 11
19. $P = 2(2) + 2(4)$; multiply 2 and 2 in. and 2 and 4 in.

Reteaching 1-2

1. 15 years old; 10 years old
2. \$10.45; \$7.95
3. 18 T-shirts; 9 T-shirts
4. 12 rows of corn; 7 rows of peas
5. 15
6. \$100

Reteaching 1-3

- 1.
- 2.
3. > 4. < 5. < 6. > 7. >
8. > 9. < 10. > 11. = 12. >
13. < 14. > 15. 3 16. 2 17. 10
18. 4 19. 4 20. 0 21. 1 22. 18
23. 50

Reteaching 1-4

1. 4 2. 12 3. -4 4. -6 5. 4
6. -5 7. 4 8. 12 9. -4 10. -19
11. 20 12. -3 13. 12 14. 4 15. -13
16. 0 17. -20 18. 17 19. -15 20. 8
21. 26 22. 1 23. 5 24. -7 25. -20
26. 57 27. -39 28. \$15 29. 15 inches

Reteaching 1-5

1. - 2. - 3. + 4. - 5. +
6. + 7. - 8. + 9. - 10. +
11. + 12. - 13. -36 14. 81 15. -9
16. 32 17. 350 18. 24 19. 50 20. -72
21. 28 22. -42 23. 48 24. -125 25. 6
26. 9 27. -5 28. 1 29. -6 30. 20
31. -4 32. 11 33. -7 34. -11 35. -20
36. -25

Reteaching 1-6

1. mean: 3; median: 3; mode: 4
2. mean: 8.1; median: 8; mode: 5
3. mean: 0.58; median: 0.5; mode: 0
4. mean: \$3.25; median: \$3.25; mode: \$4
5. Median; there is no mode and the median is greater than the mean.
6. Mode; both the median and the mean are less than the mode.

Reteaching 1-7

1. 7^3
2. $(-6)^5$
3. 10^4
4. 16
5. $(-8)^5$
6. 2^7
7. 72
8. 19
9. 51
10. -30
11. 10
12. 32
13. -47
14. 3
15. -36
16. -48

Reteaching 1-8

1. 6 2. -20 3. 92 4. 30 5. 70
6. -240 7. 1,800 8. 90 9. -280 10. 3,600
11. -96 12. -14 13. $8(4 - 0.1) = 31.2$
14. $6(20 + 1) = 126$
15. $4(7 + 0.2) = 28.8$
16. $5(40 - 2) = 190$
17. $6(10 + 0.1) = 60.6$
18. $7(40 + 2) = 294$

Enrichment 1-1

1. 10, 12, 14
2. The numbers increase by 5, 5, 10, 15, 20, 25, 30, 35
3. The numbers increase by 6, 7, 13, 19, 25, 31, 37, 43
4. The numbers increase by 4, 6, 10, 14, 18, 22, 26, 30
5. The numbers increase by 2 more than the previous increase. 1, 4, 9, 16, 25, 36, 49
6. The numbers increase by 2 more than the previous increase. 2, 5, 10, 17, 26, 37, 50
7. The numbers increase by 4 more than the previous increase. 7, 13, 23, 37, 55, 77, 103
8. $2x^2 + 1$

Enrichment 1-2

1. Add the lengths of the four sides.
2. 24 feet 3. f feet by $(f + 2)$ feet
4. Sample answer: $4f + 4 = 24$
5. 28 feet
6. No; if the north wall is 6 ft, the adjoining walls must be 8 ft, so, the distance around is 28 ft; $28 \neq 24$.
7. Draw a diagram; add the lengths of the sides.
8. Yes; since the distance around is $4w + 8$, let $w = 6$. The distance is $4(6) + 8$ or 32 ft.

Enrichment 1-3

1. -1; E; -1; -1; E; -1; -1; -2; -2; -2; -2; -1; -1; E; E
2. 2 holes; 4 holes 3. Tiger shot 2 under par, or 2 below par.

Enrichment 1-4

1. 5,602.10 2. 5
3. The Dow Jones average at the start of the week.
4. positive: 37.70, 24.90, 27.15; negative: 8.70, 11.25
5. $x - 8.70 + 37.70 - 11.25 + 24.90 + 27.15 = 5,602.10$
6. 5,532.30 7a. 137.52
- 7b. The Dow closed at a value less than the average; 20.32 points less.
8. It is a negative change, because the Dow changed by -531 points.

Practice 2-1**Solving One-Step Equations****Solve each equation. Check the solution.**

1. $x - 6 = -18$

2. $-14 = 8 + j$

3. $4.19 + w = 19.72$

4. $b + \frac{1}{6} = \frac{7}{8}$

5. $9 + k = 27$

6. $14 + t = -17$

7. $v - 2.59 = 26$

8. $r + 9 = 15$

9. $n - 19 = 26$

10. $14 = -3 + s$

11. $9 = d - 4.3$

12. $g - \frac{1}{4} = \frac{5}{8}$

13. $\frac{a}{-6} = 2$

14. $18 = \frac{v}{-1.8}$

15. $46 = 2.3m$

16. $-114 = -6k$

17. $0 = \frac{b}{19}$

18. $136 = 8y$

19. $0.6j = -1.44$

20. $\frac{q}{7.4} = 8.3$

21. $28b = -131.6$

22. $\frac{n}{-9} = -107$

23. $37c = -777$

24. $\frac{n}{-1.28} = 4.96$

Write and solve an equation for each situation.

25. Yesterday Josh sold some boxes of greeting cards. Today he sold seven boxes. If he sold 25 boxes in all, how many did he sell yesterday?
-
- _____

26. Skylar bought seven books at \$12.95 each. How much did Skylar spend?
-
- _____

27. After Simon donated four books to the school library, he had 28 books left. How many books did Simon have to start with?
-
- _____

28. Eugenio has five payments left to make on his computer. If each payment is \$157.90, how much does he still owe?
-
- _____

Practice 2-2**Solving Two-Step Equations****Solve each equation.**

1. $4r + 6 = 14$

2. $9y - 11 = 7$

3. $\frac{m}{4} + 6 = 3$

4. $\frac{k}{-9} + 6 = -4$

5. $-5b - 6 = -11$

6. $\frac{v}{-7} + 8 = 19$

7. $3.4t + 19.36 = -10.22$

8. $\frac{n}{-1.6} + 7.9 = 8.4$

9. $4.6b + 26.8 = 50.72$

10. $\frac{a}{-8.06} + 7.02 = 18.4$

11. $-2.06d + 18 = -10.84$

12. $\frac{e}{-95} + 6 = 4$

13. $-9i - 17 = -26$

14. $\frac{j}{-1.9} + 2.7 = -8.6$

15. $14.9 = 8.6 + 0.9m$

16. $84 = 19 + \frac{z}{12}$

17. $15w - 21 = -111$

18. $-12.4 = -19.1 + \frac{n}{-7.9}$

19. Hugo received \$100 for his birthday. He then saved \$20 per week until he had a total of \$460 to buy a printer. Use an equation to show how many weeks it took him to save the money.

20. A health club charges a \$50 initial fee plus \$2 for each visit. Moselle has spent a total of \$144 at the health club this year. Use an equation to find how many visits she has made.

Solve each equation to find the value of the variable. Write the answer in the puzzle. Do not include any negative signs or any decimals.

ACROSS

1. $6n - 12 = 2.4$

2. $\frac{n}{3} + 4.6 = 21.6$

4. $x - 3 = 51.29$

6. $2z + 2 = 7.6$

DOWN

1. $\frac{j}{5} - 14 = -9$

2. $3x - 2 = 169$

3. $\frac{x}{4} + 1 = 19$

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

5. $2x - 2 = 182$

1.			2.	
3.				
4.			5.	
			6.	

Reteaching 2-3

Simplifying Algebraic Expressions

A *term* is a number, a variable, or the product of a number and variable(s). The two terms in $-2x + 4y$ are $-2x$ and $4y$.

Terms with exactly the same variable factor are called *like terms*. In $-3x + 4y + 5x$, $-3x$ and $5x$ are like terms.

One way to *combine like terms* is by addition or subtraction.

- Add to combine like terms in $4y + y$.

$$4y + y = (4 + 1)y = 5y$$

- Subtract to combine like terms in $2m - 5m$.

$$2m - 5m = (2 - 5)m = -3m$$

To *simplify* an expression, combine its like terms. Perform as many of its operations as possible.

Simplify:

$$\begin{aligned}3a + 5b - a + 2b \\= (3a - a) + (5b + 2b) \\= 2a + 7b\end{aligned}$$

Simplify:

$$\begin{aligned}2(x - 4) \\= 2x - 2(4) \\= 2x - 8\end{aligned}$$

Combine like terms.

1. $6x + 2x =$ _____

2. $4c - c =$ _____

3. $-h - h =$ _____

4. $-3y + 4y =$ _____

5. $m - 5m =$ _____

6. $6n + n =$ _____

7. $2s - 6s =$ _____

8. $-t - 2t =$ _____

9. $3b - 9b =$ _____

10. $-2p - 5p =$ _____

11. $v + 9v =$ _____

12. $-4j + j =$ _____

Simplify each expression.

13. $8(c - 5) =$ _____

14. $4(d + 6) =$ _____

15. $5n + 3 + n =$ _____

16. $x + 2y + x + y =$ _____

17. $3(m + 4) - 5m =$ _____

18. $(v - 4)5 =$ _____

19. $4a + 2 - 8a + 1 =$ _____

20. $6s + 5 - (s - 6) =$ _____

21. $3(u + 4) - 5u =$ _____

22. $2x + y - (9 - 4x) =$ _____

23. $-5x + 3(x - y) =$ _____

24. $v + 6v - 2v =$ _____

25. $-2s + 6 - s - 4 =$ _____

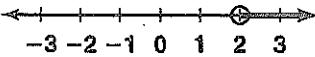
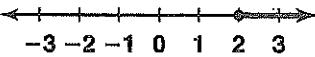
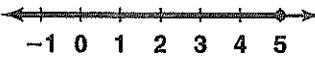
26. $-x + 4(x - 2) =$ _____

27. $3(k + j) - 4k - k =$ _____

28. $4a - 6 - a + 1 =$ _____

Reteaching 2-6**Solving Inequalities by Adding and Subtracting**

You can graph inequality solutions on a number line.

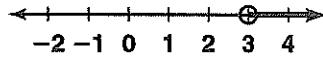
Inequality	Graph	How to Read the Graph
$x > 2$ x is greater than 2		An open dot at 2 shows that 2 is not included. All numbers greater than 2 are included.
$x < 2$ x is less than 2		An open dot at 2 shows that 2 is not included. All numbers less than 2 are included.
$x \geq 2$ x is equal to or greater than 2		A solid dot at 2 shows that 2 is included. All numbers greater than 2 are also included.
$x \leq 2$ x is equal to or less than 2		A solid dot at 2 shows that 2 is included. All numbers less than 2 are also included.

To help solve an inequality, you can subtract the same number from or add the same number to each side.

Solve: $x + 5 > 8$.

$$\begin{aligned}x + 5 &> 8 \\x + 5 - 5 &> 8 - 5 \quad \leftarrow \text{Subtract 5 from each side.} \\x &> 3 \quad \leftarrow \text{Simplify.}\end{aligned}$$

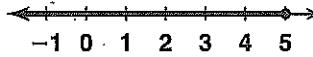
Graph the solution:



Solve: $y - 4 \leq 1$.

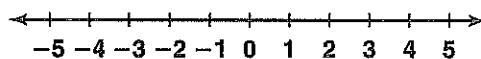
$$\begin{aligned}y - 4 &\leq 1 \\y - 4 + 4 &\leq 1 + 4 \quad \leftarrow \text{Add 4 to each side.} \\y &\leq 5 \quad \leftarrow \text{Simplify.}\end{aligned}$$

Graph the solution:

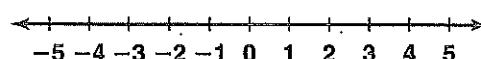


Graph each inequality on a number line.

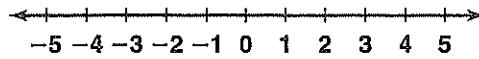
1. $x > -2$



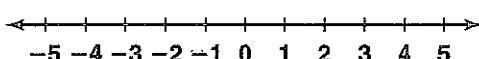
3. $y \leq -1$



2. $4 \geq a$

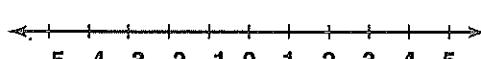


4. $t \geq 0$

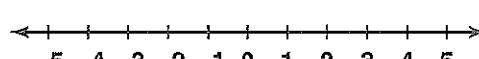


Solve each inequality. Graph the solution.

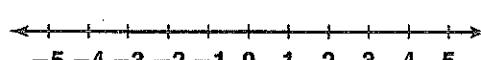
5. $9 + a > 11$ _____



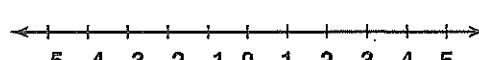
6. $-4 + r < 0$ _____



7. $2 > n - 1$ _____



8. $1 + s \leq 5$ _____



Reteaching 2-7**Solving Inequalities by Multiplying or Dividing**

To help solve an inequality, you can divide or multiply each side by the same number. However, if the number is a negative number, you must also *reverse* the direction of the inequality.

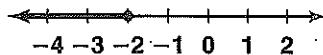
Solve: $-3y \geq 6$. Graph the solution.

$$-3y \geq 6$$

$$\frac{-3y}{-3} \leq \frac{6}{-3} \leftarrow \text{Divide each side by } -3. \quad \leftarrow \text{Reverse the direction of the inequality.}$$

$$y \leq -2 \leftarrow \text{Simplify.}$$

Graph:



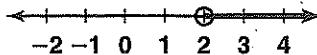
Solve: $\frac{a}{2} > 1$. Graph the solution.

$$\frac{a}{2} > 1$$

$$2\left(\frac{a}{2}\right) > 1(2) \leftarrow \text{Multiply each side by 2.}$$

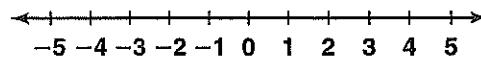
$$a > 2 \leftarrow \text{Simplify.}$$

Graph:

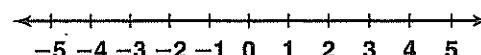


Solve each inequality and graph the solutions.

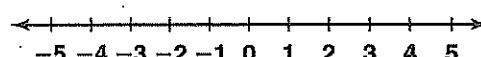
1. $2a > 8$ _____



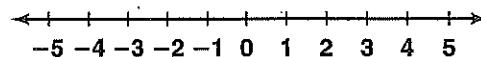
2. $12 < -3r$ _____



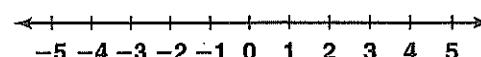
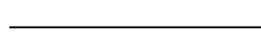
3. $\frac{1}{3}n > 1$ _____



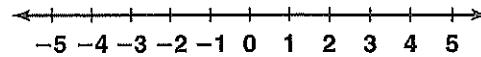
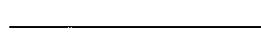
4. $12 \geq 6s$ _____



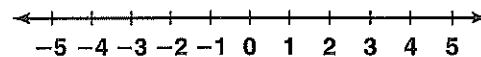
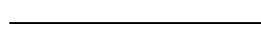
5. $\frac{m}{4} < 1$ _____



6. $5q \geq 5$ _____



7. $-4x \leq 8$ _____



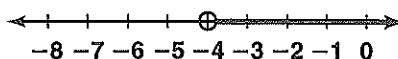
8. What is the least whole number solution of $-9x < -27$?

9. Donna sings on average $2\frac{1}{2}$ minutes per song. If a cassette holds 20 minutes of songs, what is the greatest number of songs she can record on a cassette?

Chapter 2 Answers (continued)

Practice 2-7

1. $m > -4$



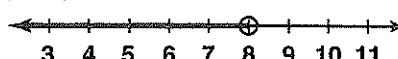
2. $j \leq 0$



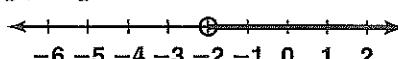
3. $v > 4$



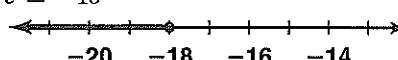
4. $b < 8$



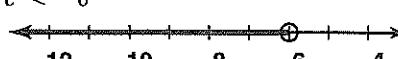
5. $a > -2$



6. $c \leq -18$



7. $c < -6$



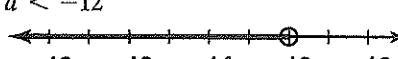
8. $i \geq 4$



9. $d < -15$



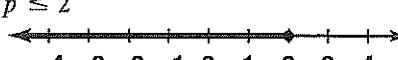
10. $d < -12$



11. $n \geq -5$



12. $p \leq 2$



13. $5b \leq \$20$; \$4

14. $5p \leq 50$; 10 pages

15. $8t \geq 125$; at least 16 tables

Practice 2-8

1. $x \leq -4$
2. $x < 6$
3. $x > 2$
4. $x \geq -5$
5. $x \geq 5$
6. $x > -1$
7. $x \leq -3$
8. $x < 7$
9. $x < 4$
10. $x \leq 60$
11. $x > -68$
12. $x \geq 180$
13. $x \geq 11$
14. $x \leq 21$
15. $x > 2.7$
16. $x < 12$
17. $x > -40$
18. $x < -50$
19. $n \leq 44$
20. $x \geq 35$
21. $n \leq 7$
22. $x \geq -8$
23. $x > 5.1$
24. $x > -10$
25. $w > 170$
26. $x < -36$
27. $u \leq 48$
28. $8t \geq 1,250 + 830$; $t \geq 2,080$; $t \geq 260$; at least 260 tickets
29. $3.5h + 18.25 \leq 30$; $3.5h \leq 11.75$; $h < 3.36$; at most 3 hamsters

Reteaching 2-1

1. 5; 5; 6; 11
2. 13; 13; 14; 14; 27
3. $y - 18 + 18 = 24 + 18$; $y = 42$; $y - 18 = 24$; $42 - 18 \underline{=} 24$; $24 = 24$
4. 3; 3; 6; 18
5. $-5; -5; 65; 65; -13$
6. $\frac{y \cdot 8}{8} = \frac{24}{8}$; $y = 3$; $3 \cdot 8 \underline{=} 24$; $24 = 24$
7. -6
8. 5
9. $-3\frac{1}{2}$
10. 2
11. 0.64
12. 5

Reteaching 2-2

1. 5; 5; 2; 2; 10; 10; 25
2. 2; 2; 2; 8; 8; 2
3. $7y - 17 + 17 = -38 + 17$; $\frac{7y}{7} = \frac{-21}{7}$; $y = -3$; $7y - 17 = -38$; $7 \cdot (-3) - 17 \underline{=} -38$; $-38 = -38$
4. 4
5. 7
6. $\frac{1}{30}$
7. -1
8. -10
9. -12

Reteaching 2-3

1. $8x$
2. $3c$
3. $-2h$
4. y
5. $-4m$
6. $7n$
7. $-4s$
8. $-3t$
9. $-6b$
10. $-7p$
11. $10v$
12. $-3j$
13. $8c - 40$
14. $4d + 24$
15. $6n + 3$
16. $2x + 3y$
17. $-2m + 12$
18. $5v - 20$
19. $-4a + 3$
20. $5s + 11$
21. $-2u + 12$
22. $6x + y - 9$
23. $-2x - 3y$
24. $5v$
25. $-3s + 2$
26. $3x - 8$
27. $3j - 2k$
28. $3a - 5$

Reteaching 2-4

1. -12
2. 10
3. 3
4. $\frac{1}{3}$
5. 9
6. 6
7. 22
8. -3
9. -1
10. 4
11. 7
12. 5
13. -1
14. -5
15. 4
16. 3
17. -2
18. -2
19. $\frac{1}{4}$
20. 14
21. 5

Reteaching 2-5

1. adult \$6.50, child \$4.50
2. width 9 ft, length 12 ft
3. 409 mi the first day and 433 mi the second day
4. 5 bags

Chapter 2 Answers

Practice 2-1

1. -12
2. -22
3. 15.53
4. $\frac{17}{24}$
5. 18
6. -31
7. 28.59
8. 6
9. 45
10. 17
11. 13.3
12. $\frac{7}{8}$
13. -12
14. -32.4
15. 20
16. 19
17. 0
18. 17
19. -2.4
20. 61.42
21. -4.7
22. 963
23. -21
24. -6.3488
25. $n + 7 = 25$; 18 boxes
26. $c = 7 \times 12.95$; \$90.65
27. $t - 4 = 28$; 32 books
28. $b = 5 \times 157.90$; \$789.50

Practice 2-2

1. 2
2. 2
3. -12
4. 90
5. 1
6. -77
7. -8.7
8. -0.8
9. 5.2
10. -91.7228
11. 14
12. 190
13. 1
14. 21.47
15. 7
16. 780
17. -6
18. -52.93
19. $100 + 20w = 460$; 18 wk
20. $50 + 2v = 144$; 47 visits

1.	2	4		2.	5	1
5				7		
		3.	7			
4.	5	4	2	5.	9	
4				6.	2	8

Practice 2-3

1. $6a + 7$
2. $8k - 72$
3. $9n$
4. $7w + 21$
5. $5b - 21$
6. $12 + 8t$
7. $14 + 3k$
8. $3j$
9. $6d - 48$
10. $8x + 39$
11. $4m + 21$
12. $2f - 11$
13. $12v - 8$
14. $9g + 47$
15. $9h - 1$
16. $5e - 44$
17. $4y + 7$
18. $2.13m + 1.8$
19. $64k + 252$
20. $3.09j + 14.214$
21. $36b - 1,008$
22. $5.86y + 8.4$
23. $4.3c + 24.08$
24. $98x - 255$
25. $5.2c + 10.9d$
26. $63m - 11$
27. $8j + 4k + 20$
28. $5.29r + 14.42s$
29. $72c - 2d + 43$
30. $9a + 8b - 2$
31. $15.3g + 2q + 3.79$
32. Let n be the number. $(2n + 6) \div 2 = n + 3$;
 $(n + 3) - 3 = n$. You get the number you started with.

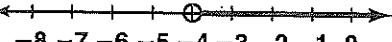
Practice 2-4

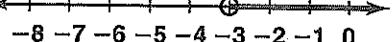
1. 1
2. 4
3. -21
4. 2.4
5. -2
6. -2.5
7. 4
8. -96
9. -8.25
10. -7
11. 11
12. 2
13. -7.5
14. 32
15. 3
16. 5
17. -9.5
18. -6
19. 2
20. 3.75
21. $50x = \$1,500$; \$30.00 per person
22. $6 = \frac{1}{6}x + 1$; 30 years old

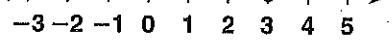
Practice 2-5

1. $9.20 = 0.56 + 0.32(x - 1)$; 28 min; Sample answer: An equation was used because it is the best way to represent the situation.
2. 13th floor; Sample answer: A diagram was used to show the floors and the elevator going up and down.
3. $26t + 32t = 232$; 4 hours; Sample answer: Either a diagram, an equation, or both can be used.
4. $t(t - 1) = 812$; 28 and 29
5. \$210
6. 3 hours

Practice 2-6

1. $x \leq 1$
2. $x \geq -3$
3. $x \geq -2$
4. $x \geq 1$
5. $x > 3$
6. 
7. 
8. 
9. 
10. 
11. $m > -4$

12. $q \leq 5$

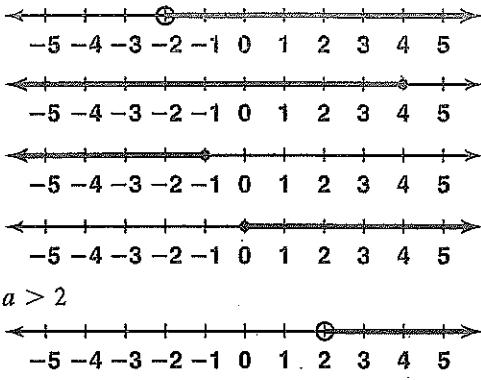
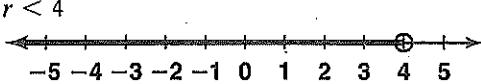
13. $w > -3$

14. $y < -1$

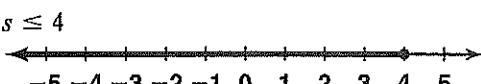
15. $k \leq 3$

16. $u \geq 2$

17. $x + 8 < 24$; less than 16 in.
18. $235 + n > 462$; more than 227 points

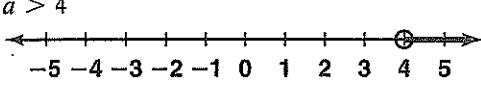
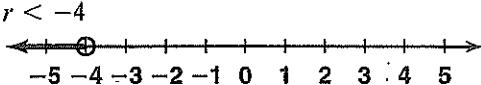
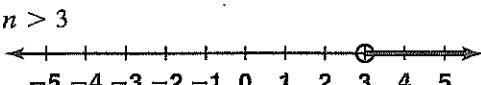
Chapter 2 Answers (continued)

Reteaching 2-6

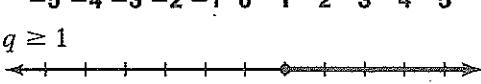
1. $a > 2$

2. $r < 4$

3. $n < 3$

4. $s \leq 4$


Reteaching 2-7

1. $a > 4$

2. $r < -4$

3. $n > 3$

4. $s \leq 2$

5. $m < 4$

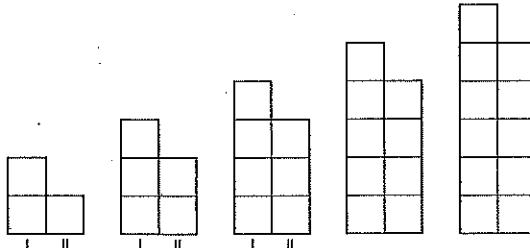
6. $q \geq 1$

7. $x \geq -2$

8. 4
9. 8 songs

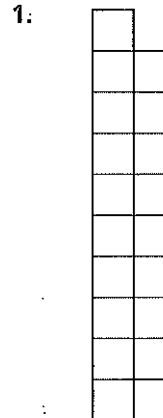
Reteaching 2-8

1. $x < 10$
2. $x < 300$
3. $x < 5$
4. $x \leq 21$
5. $x \geq 9$
6. $x \leq 88$
7. $x \geq 20$
8. $x < -108$
9. $x < 125$
10. $x < 28$
11. $x \geq 2$
12. $x \geq 2.3$

Enrichment 2-1



Column I	2	3	4	5	6
Column II	1	2	3	4	5



2. 19 squares

3a. $n - 1$

3b. $n + (n - 1) = 2n - 1$

4. 99 squares

Column I	n	1	2	3	4	5	6	10	50
Column II	$n + 5$	6	7	8	9	10	11	15	55

Enrichment 2-2

1. 18 and 19
2. -74 and -73
3. -11, -10, -9
4. 29, 30, 31, 32, 33
5. 16, 18, 20
6. -5, -3, -1, 1
7. 30

Enrichment 2-3

1. Sample answers: 3-inch single; it's cheaper.
2. 4-inch: 9 reprints; 3-inch: 6 reprints
3. 4-inch prints: 3 double prints and 1 single print; \$38.36
3-inch prints: 3 double prints and 1 single print; \$31.36
4. 4-inch single prints, since the larger pictures show a greater amount of detail.

Reteaching 3-1**Graphing Points**

You can graph a point on a *coordinate plane*. Use an *ordered pair* (x, y) to record the coordinates. The first number in the pair is the *x-coordinate*. The second number is the *y-coordinate*.

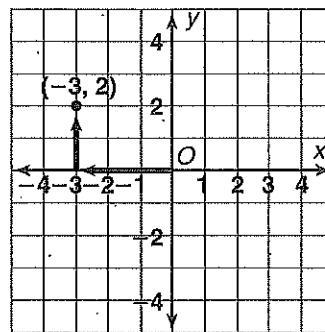
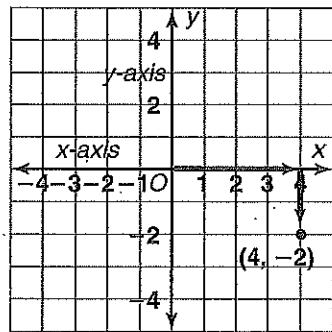
To graph a point, start at the origin, O . Move horizontally according to the value of x . Move vertically according to the value of y .

Example 1: $(4, -2)$

Start at O , move right 4, then down 2.

Example 2: $(-3, 2)$

Start at O , move left 3, then up 2.



Graph each ordered pair on the coordinate plane. Label each point with its letter. Then connect the points in order from A to S . Connect point S with point A to complete a picture.

$$A(7, 7)$$

$$J(-4, -6)$$

$$B(6, 3)$$

$$K(-7, -7)$$

$$C(6, 2)$$

$$L(-5, 1)$$

$$D(5, 1)$$

$$M(-6, 2)$$

$$E(7, -7)$$

$$N(-6, 3)$$

$$F(4, -6)$$

$$P(-7, 7)$$

$$G(1, -2)$$

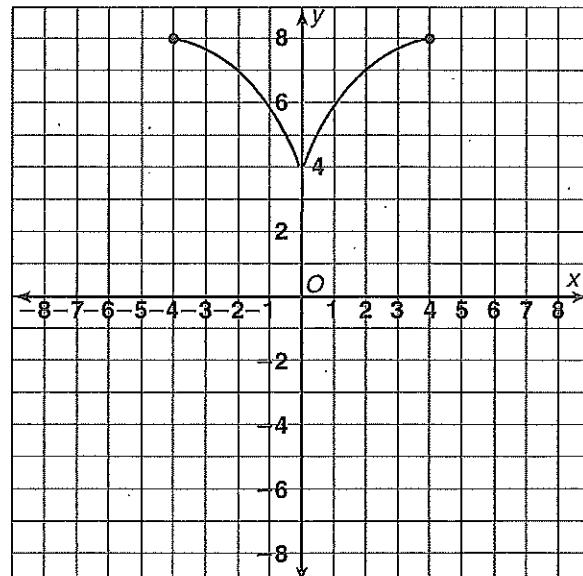
$$Q(-1, 3)$$

$$H(0, -4)$$

$$R(0, 4)$$

$$I(-1, -2)$$

$$S(1, 3)$$



Practice 3-1**Graphing Points**

Name the coordinates of each point in the graph.

1. *J*

2. *R*

3. *K*

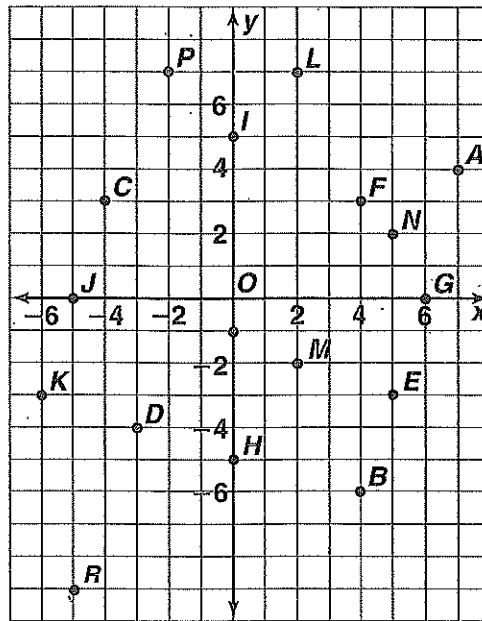
4. *M*

5. *I*

6. *P*

7. *N*

8. *L*



In which quadrant or on which axis is each point located?

9. $(-3, -2)$

10. $(7, 0)$

11. $(4, 0)$

12. $(-3, -9)$

13. $(4, -7)$

14. $(7, -5)$

15. $(2, 9)$

16. $(0, 9)$

17. $(0, -6)$

18. $(4, 2)$

19. $(-3, 2)$

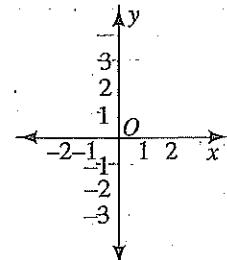
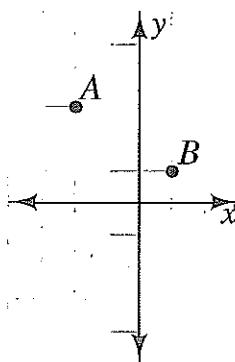
20. $(0, 0)$

21. Arnie plotted points on the graph below. He placed his pencil point at *A*. He can move either right or down any number of units until he reaches point *B*. In how many ways can he do this?

22. Marika had to draw $\triangle ABC$ that fit several requirements.

- It must fit in the box shown.
- The side \overline{AB} has coordinates $A(-2, 0)$ and $B(2, 0)$.
- Point *C* must be on the *y*-axis.

Name all the points that could be point *C*.



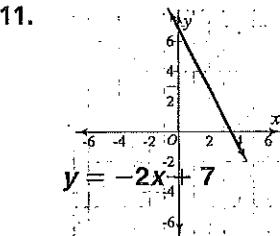
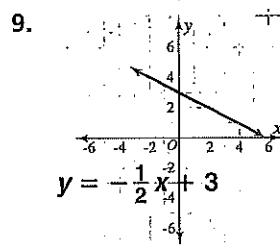
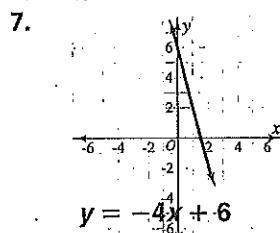
Chapter 3 Answers

Practice 3-1

1. $(-5, 0)$
2. $(-5, -9)$
3. $(-6, -3)$
4. $(2, -2)$
5. $(0, 5)$
6. $(-2, 7)$
7. $(5, 2)$
8. $(2, 7)$
9. III
10. x -axis
11. x -axis
12. III
13. IV
14. IV
15. I
16. y -axis
17. y -axis
18. I
19. II
20. x -axis, y -axis
21. 10 ways
22. $(0, 5), (0, 4), (0, 3), (0, 2), (0, 1), (0, -1), (0, -2), (0, -3), (0, -4), (0, -5)$

Practice 3-2

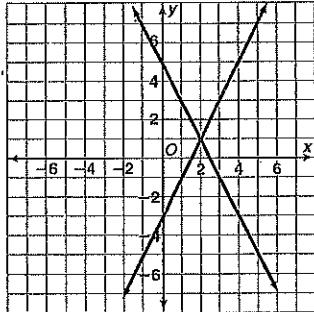
- 1a. yes 1b. no 1c. no 1d. yes 2a. no
 2b. yes 2c. yes 2d. yes 3. 1 4. 11
 5. -39 6. 137



13. 5 maps 14. none

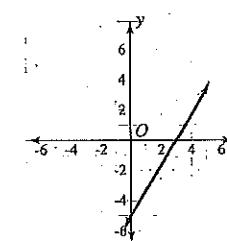
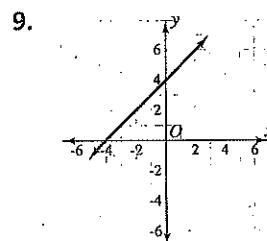
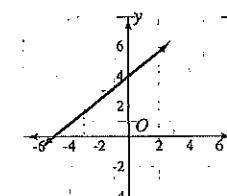
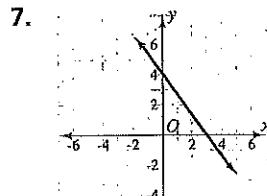
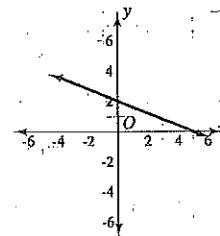
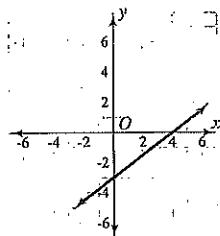
Practice 3-3

1. 3 2. $-\frac{1}{2}$ 3. 0 4. $\frac{1}{2}$ 5. $-\frac{3}{2}$
 6. 2 7. -2



Practice 3-4

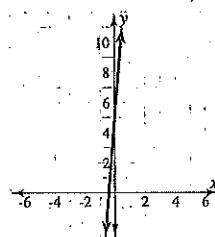
1. yes 2. no 3. no 4. no
 5.



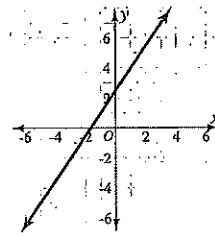
11. $y = -2x + 3$ 12. $y = 3x$ 13. $y = -x - 3$

Practice 3-5

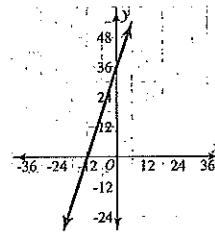
1. $y = 12x + 5$
 1a. \$77
 1b. \$53



2. $y = 1.5x + 2.5$
 2a. \$16
 2b. \$38.50



3. $y = 3x + 36$
 3a. 57 in.
 3b. 120 in.



4. \$69 5. 28 posts 6. Coley 7. 84 pages

Reteaching 4-2**Equivalent Forms of Rational Numbers**

A fraction is in simplest form when the *greatest common factor* (GCF) of the numerator and denominator is 1.

Example 1: Write $\frac{24}{36}$ in simplest form.

Use prime factorization and circle the common factors.

$$\begin{array}{rcl} 24 & = & (2) \cdot (2) \cdot 2 \cdot 3 \\ 36 & = & (2) \cdot (2) \cdot 3 \cdot 3 \end{array}$$

So, $\frac{24}{36} = \frac{2}{3}$.

To write a fraction as a decimal:

- ① Divide numerator by denominator.
- ② Divide until the remainder is 0 or until the remainder repeats.
- ③ Use a bar to show digits repeating.

Example 2: Write $\frac{5}{6}$ as a decimal.

$$\begin{array}{r} 0.833 \\ 6 \overline{)5.000} \\ -48 \\ \hline 20 \\ -18 \\ \hline 20 \\ -18 \\ \hline 2 \end{array} \leftarrow \text{Remainder repeats.}$$

So, $\frac{5}{6} = 0.833\ldots$, or $0.\overline{833}$.

Use algebra to write a repeating decimal as a fraction.

Example 3: Write $0.\overline{7}$ as a fraction.

$$\begin{aligned} \text{① Let } n \text{ be the decimal.} \quad n &= 0.\overline{7} \\ \text{② Multiply each side} & \quad 10n = 7.\overline{7} \\ \text{by 10 because one} & \\ \text{digit repeats.} & \\ \text{③ Subtract the} & \quad 10n = 7.777\ldots \\ \text{equations.} & - n = 0.777\ldots \\ & \hline 9n = 7 \\ \text{④ Solve for } n. & \quad 9n = 7 \\ & \quad \frac{9n}{9} = \frac{7}{9} \\ & \quad n = \frac{7}{9} \end{aligned}$$

So, $0.\overline{7} = \frac{7}{9}$.

Write each fraction in simplest form.

1. $\frac{16}{64}$ _____

2. $\frac{-30}{48}$ _____

3. $\frac{42}{63}$ _____

4. $\frac{-32}{40}$ _____

5. $\frac{12}{-28}$ _____

6. $\frac{18}{27}$ _____

Write each fraction or mixed number as a decimal rounded to three decimal places.

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

8. $-3\frac{2}{7}$ _____

9. $\frac{5}{9}$ _____

10. $5\frac{3}{7}$ _____

11. $\frac{4}{3}$ _____

12. $\frac{1}{11}$ _____

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

13. $0.\overline{1}$ _____

14. $0.1\overline{6}$ _____

15. $0.\overline{3}$ _____

16. $0.\overline{8}$ _____

17. 0.6 _____

18. $0.\overline{36}$ _____

Reteaching 4-4

To add or subtract fractions and mixed numbers with unlike denominators, first rewrite the fractions using the least common denominator (LCD).

Subtract: $2\frac{3}{4} - 5\frac{1}{3}$

$$\begin{aligned} 2\frac{3}{4} - 5\frac{1}{3} &= \frac{11}{4} - \frac{16}{3} \\ &= \frac{33}{12} - \frac{64}{12} \quad \leftarrow \text{The LCD is 12.} \\ &= \frac{-31}{12} \quad \leftarrow \text{Subtract numerators.} \\ &= -2\frac{7}{12} \quad \leftarrow \text{Simplify.} \end{aligned}$$

$$2\frac{3}{4} - 5\frac{1}{3} = -2\frac{7}{12}$$

Adding and Subtracting Rational Numbers

You can use addition or subtraction to solve equations with rational numbers.

Solve: $h - \frac{3}{8} = \frac{1}{6}$

$$\begin{aligned} h - \frac{3}{8} + \frac{3}{8} &= \frac{1}{6} + \frac{3}{8} \quad \leftarrow \text{Add } \frac{3}{8}. \\ h &= \frac{4}{24} + \frac{9}{24} \quad \leftarrow \text{The LCD is 24.} \\ h &= \frac{13}{24} \end{aligned}$$

Find each sum or difference as a fraction or mixed number in simplest form.

1. $6\frac{1}{4} - 2\frac{3}{8}$

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

3. $-4\frac{1}{3} - \left(-\frac{3}{5}\right)$

4. $\frac{1}{8} - \left(-\frac{1}{6}\right)$

5. $-1\frac{3}{8} - 4\frac{1}{12}$

6. $\frac{7}{10} + \left(-1\frac{2}{5}\right)$

7. $1\frac{5}{8} - \left(-2\frac{1}{2}\right)$

8. $-2\frac{1}{3} - \left(-1\frac{5}{12}\right)$

9. $-10 - \left(3\frac{11}{12}\right)$

10. $1\frac{1}{3} - 4\frac{3}{4}$

11. $9 + \left(-6\frac{5}{9}\right)$

12. $-2\frac{5}{6} - 5\frac{5}{12}$

Solve each equation. Write each answer as a mixed number or as a fraction in simplest form.

13. $y + \frac{7}{8} = -\frac{1}{4}$

14. $c + \frac{3}{5} = \frac{1}{2}$

15. $m - 3\frac{2}{3} = 1\frac{1}{6}$

16. $x - 2\frac{1}{4} = -3$

17. $n + \frac{1}{2} = -2\frac{5}{6}$

18. $\frac{1}{2} + d = -3\frac{1}{5}$

19. $7.3 + g = 1\frac{4}{5}$

20. $y - 4.1 = 2\frac{3}{4}$

21. $z + 2.6 = 0.37$

Reteaching 4-5

To multiply rational numbers in fraction form, multiply numerators, then multiply denominators.

Multiply: $\frac{7}{12} \cdot 1\frac{4}{5}$

$$\begin{array}{r} \frac{7}{12} \cdot \frac{9}{5} \\ \hline \frac{7 \cdot 9}{12 \cdot 5} \end{array}$$

← fraction form
← Multiply numerators.
← Multiply denominators.

$$\frac{63}{60} = 1\frac{3}{60} = 1\frac{1}{20}$$

← Simplify.

Multiplying and Dividing Rational Numbers

To divide, multiply by the reciprocal of the divisor.

Divide: $-3\frac{1}{8} \div \frac{2}{3}$

$$\begin{array}{r} -\frac{25}{8} \div \frac{2}{3} \\ \hline -\frac{25}{8} \cdot \frac{3}{2} \\ \hline -\frac{25 \cdot 3}{8 \cdot 2} = -\frac{75}{16} \end{array}$$

← fraction form
← reciprocal of divisor
← Multiply.
= $-4\frac{11}{16}$ ← Simplify.

Find each product. Write each answer as a fraction or mixed number in simplest form.

1. $\frac{8}{9} \cdot \left(-\frac{3}{4}\right)$

2. $-\frac{1}{2} \cdot \frac{4}{5}$

3. $-\frac{2}{3} \cdot \left(-\frac{1}{8}\right)$

4. $\frac{5}{6} \cdot \frac{3}{7}$

5. $\frac{3}{4} \cdot \left(-\frac{2}{3}\right)$

6. $3 \cdot 2\frac{1}{4}$

7. $-5\frac{1}{2} \cdot 1\frac{3}{4}$

8. $-2\frac{1}{8} \cdot (-3)$

9. $4\frac{1}{5} \cdot 2\frac{1}{2}$

10. $\frac{13}{15} \cdot \frac{5}{6}$

11. $-3\frac{2}{5} \cdot 2\frac{1}{2}$

12. $-5 \cdot \left(-2\frac{1}{4}\right)$

13. $-\frac{5}{8} \cdot 4\frac{2}{3}$

14. $-5 \cdot 3\frac{3}{10}$

15. $-2\frac{3}{5} \cdot \left(-3\frac{1}{3}\right)$

Find each quotient.

16. $\frac{5}{6} \div \frac{3}{5}$

17. $-\frac{3}{8} \div \left(-\frac{1}{2}\right)$

18. $-6 \div \frac{3}{4}$

19. $4 \div \left(-\frac{2}{3}\right)$

20. $5\frac{1}{4} \div 1\frac{1}{2}$

21. $1\frac{1}{4} \div \left(-\frac{2}{5}\right)$

22. $-\frac{3}{4} \div \left(-1\frac{1}{2}\right)$

23. $-1\frac{3}{5} \div \frac{1}{4}$

24. $2\frac{1}{2} \div \frac{3}{10}$

25. $-\frac{5}{9} \div \left(-\frac{2}{3}\right)$

26. $-6 \div 3\frac{5}{8}$

27. $\frac{3}{4} \div (-9)$

Practice 4-4**Adding and Subtracting Rational Numbers.**

Find each sum or difference as a mixed number or fraction in simplest form.

1. $\frac{3}{4} + \frac{7}{8}$ _____

2. $-1\frac{1}{6} + 2\frac{2}{3}$ _____

3. $4\frac{1}{2} - 7\frac{7}{8}$ _____

4. $-3\frac{5}{6} - (-4\frac{1}{12})$ _____

5. $\frac{5}{18} + \frac{7}{12}$ _____

6. $-4\frac{7}{20} + 3\frac{9}{10}$ _____

7. $5\frac{8}{21} - (-3\frac{1}{7})$ _____

8. $1\frac{19}{24} + 2\frac{23}{20}$ _____

9. $3\frac{16}{25} - 4\frac{7}{20}$ _____

10. $5\frac{1}{14} + 2\frac{3}{7} + 1\frac{4}{21}$ _____

11. $\frac{11}{12} - \frac{5}{16} + \frac{11}{18}$ _____

12. $\frac{5}{6} + \frac{7}{8} - \frac{11}{12}$ _____

13. $-19\frac{5}{6} + 10\frac{9}{10}$ _____

14. $4\frac{7}{18} - 3\frac{7}{12}$ _____

15. $-1\frac{4}{5} - (-4\frac{1}{12})$ _____

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

16. $14.6 + (-3\frac{1}{5})$ _____

17. $-7\frac{3}{4} - 4.125$ _____

18. $5.75 + (-2\frac{1}{8})$ _____

19. $1\frac{3}{4} - 2.75 - 4\frac{5}{8}$ _____

20. $3\frac{1}{2} - 6\frac{7}{10} + 4\frac{1}{5}$ _____

21. $\frac{3}{16} + \frac{1}{8} - \frac{1}{4}$ _____

Solve each equation. Write each answer as a mixed number or as a fraction in simplest form.

22. $x + \frac{3}{8} = -\frac{1}{4}$ _____

23. $y - \frac{1}{5} = -\frac{4}{5}$ _____

24. $z + \left(-\frac{2}{3}\right) = -\frac{1}{6}$ _____

25. $m - \frac{9}{10} = \frac{1}{5}$ _____

26. $n - 1\frac{1}{3} = -3$ _____

27. $p + \frac{7}{12} = -\frac{1}{4}$ _____

28. $c - 7.2 = -3.7$ _____

29. $d - 0.16 = 2.3$ _____

30. $\frac{1}{8} + a = -2\frac{1}{4}$ _____

31. Stanley is helping in the library by mending torn pages. He has cut strips of tape with lengths of $5\frac{1}{2}$ in., $6\frac{7}{8}$ in., $3\frac{3}{4}$ in., and $4\frac{3}{16}$ in. What is the total length of tape he has used?

Practice 4-5**Multiplying and Dividing Rational Numbers**

Find each product or quotient. Write each answer as a fraction or mixed number in simplest form.

1. $-\frac{1}{6} \cdot 2\frac{3}{4}$ _____

2. $\frac{3}{16} \div (-\frac{1}{8})$ _____

3. $-\frac{31}{56} \cdot (-8)$ _____

4. $-5\frac{7}{12} \div 12$ _____

5. $-8 \div \frac{1}{4}$ _____

6. $-3\frac{1}{6} \div (-2\frac{1}{12})$ _____

7. $8\frac{3}{4} \cdot 3\frac{7}{8}$ _____

8. $-\frac{11}{12} \div \frac{5}{6}$ _____

9. $4\frac{9}{28} \cdot (-7)$ _____

10. $-1\frac{1}{15} \div 15$ _____

11. $-3 \div \frac{3}{4}$ _____

12. $-2\frac{7}{8} \div 3\frac{3}{4}$ _____

13. $-\frac{23}{24} \cdot (-8)$ _____

14. $\frac{7}{8} \cdot (-\frac{2}{7})$ _____

15. $-7 \div \frac{1}{9}$ _____

16. $-6\frac{5}{6} \div \frac{1}{6}$ _____

17. $-8 \cdot 3\frac{3}{4}$ _____

18. $\frac{7}{10} \cdot (-3\frac{1}{4})$ _____

19. $5 \cdot (-3\frac{5}{6})$ _____

20. $-\frac{8}{9} \div (-3\frac{2}{3})$ _____

21. $2\frac{1}{3} \div \frac{2}{3}$ _____

Solve each equation.

22. $\frac{1}{3}a = \frac{3}{10}$ _____

23. $-\frac{3}{4}b = 9$ _____

24. $-\frac{7}{8}c = 4\frac{2}{3}$ _____

25. $\frac{5}{6}n = -3\frac{3}{4}$ _____

26. $-\frac{3}{5}x = 12$ _____

27. $-2\frac{2}{3}y = 3\frac{1}{3}$ _____

28. $\frac{7}{12}y = -2\frac{4}{5}$ _____

29. $2\frac{1}{4}z = -\frac{1}{9}$ _____

30. $2\frac{1}{5}d = -\frac{1}{2}$ _____

31. One pound of flour contains about four cups. A recipe calls for $2\frac{1}{4}$ c of flour. How many full recipes can you make from a two-pound bag of flour?

32. Kim needs $2\frac{1}{2}$ ft of wrapping paper to wrap each package. She has five packages to wrap. How many packages can she wrap with a 12-ft roll of wrapping paper?

33. Gina and Paul are making pizza for the cast and crew of the school play. They estimate that the boys in the cast and crew will eat $\frac{1}{2}$ pizza each. They estimate that the girls will each eat $\frac{1}{3}$ of a pizza. There are 7 boys and 10 girls working on the play. How many pizzas do they need to make?

Chapter 4 Answers (continued)

Practice 4-9

1. 8 cm 2. 17.0 in. 3. 15 m 4. 14.4 ft 5. 25 m
 6. 46.4 mi 7. no 8. yes 9. no 10. yes
 11. no 12. yes 13. yes 14. no 15. no
 16. yes 17. $\sqrt{13} \approx 3.6$ 18. $\sqrt{2} \approx 1.4$ 19. 5

Reteaching 4-1

1. 6; 2; 3; 7; 2 · 3 · 7 2. 2; 2; 13; $2^2 \cdot 13$
 3. 13; 13 · 7 4. 6; 2; 3; 3; 3; 2 · 3³
 5. 2; 5; 3; 3; 2 · 3² · 5 6. 2; 47; 2 · 47
 7. 2 8. 1 9. 6 10. 6 11. 9 12. 5

Reteaching 4-2

1. $\frac{1}{4}$ 2. $-\frac{5}{8}$ 3. $\frac{2}{3}$ 4. $-\frac{4}{5}$ 5. $\frac{3}{7}$
 6. $\frac{2}{3}$ 7. 0.778 8. -3.286 9. 0.556 10. 5.429
 11. 1.333 12. 0.091 13. $\frac{1}{9}$ 14. $\frac{1}{6}$ 15. $\frac{1}{3}$
 16. $\frac{8}{9}$ 17. $\frac{2}{3}$ 18. $-\frac{4}{11}$

Reteaching 4-3

1. $\frac{6}{7}$ 2. $\frac{8}{12}$ 3. $\frac{2}{4}$ 4. $\frac{10}{12}$ 5. $\frac{8}{10}$ 6. $\frac{4}{6}$
 7. $\frac{2}{3}$ 8. $\frac{4}{5}$ 9. $\frac{1}{3}$ 10. $\frac{2}{8}$ 11. $\frac{9}{10}$ 12. $\frac{7}{8}$
 13. > 14. = 15. < 16. < 17. < 18. >
 19. = 20. > 21. > 22. < 23. > 24. >

Reteaching 4-4

1. $3\frac{7}{8}$ 2. $1\frac{1}{3}$ 3. $-3\frac{11}{15}$ 4. $\frac{7}{24}$ 5. $-5\frac{11}{24}$ 6. $-\frac{7}{10}$
 7. $4\frac{1}{8}$ 8. $-\frac{11}{12}$ 9. $-13\frac{11}{12}$ 10. $-3\frac{5}{12}$ 11. $2\frac{4}{9}$
 12. $-8\frac{1}{4}$ 13. $-1\frac{1}{8}$ 14. $1\frac{1}{10}$ 15. $4\frac{5}{6}$ 16. $-\frac{3}{4}$
 17. $-3\frac{1}{3}$ 18. $-3\frac{7}{10}$ 19. -5.5 20. 6.85 21. -2.23

Reteaching 4-5

1. $-\frac{2}{3}$ 2. $-\frac{2}{5}$ 3. $\frac{1}{12}$ 4. $\frac{5}{14}$ 5. $-\frac{1}{2}$ 6. $6\frac{3}{4}$
 7. $-9\frac{5}{8}$ 8. $6\frac{3}{8}$ 9. $10\frac{1}{2}$ 10. $1\frac{13}{18}$ 11. $-8\frac{1}{2}$ 12. $11\frac{1}{4}$
 13. $-2\frac{11}{12}$ 14. $-16\frac{1}{2}$ 15. $8\frac{2}{3}$ 16. $1\frac{7}{18}$ 17. $\frac{3}{4}$ 18. -8
 19. -6 20. $3\frac{1}{2}$ 21. $-3\frac{1}{8}$ 22. $\frac{1}{2}$ 23. $-6\frac{2}{5}$ 24. $8\frac{1}{3}$
 25. $\frac{5}{6}$ 26. $-1\frac{19}{29}$ 27. $-\frac{1}{12}$

Reteaching 4-6

1. $A = 11.56 \text{ ft}^2$ 2. $A = 13.8 \text{ m}^2$ 3. $A = 37.8 \text{ m}^2$
 4. $r = \frac{d}{t}$ 5. $\ell = \frac{A}{w}$ 6. $b = y - rx$
 7. $t = \frac{l}{pr}$ 8. $h = \frac{A}{b}$ 9. $h = \frac{V}{\ell w}$
 10. 10 h 11. 35 mi/h 12. 3 h

Reteaching 4-7

1. \$85 2. \$16.25 3. \$308 4. \$35
 5. 20 years old 6. \$36

Reteaching 4-8

1. 4 2. ≈ 9 3. ≈ 5 4. 6 5. ≈ 10
 6. ≈ 6 7. 10 8. ≈ 4 9. ≈ 2 10. 11
 11. ≈ 8 12. 12 13. ≈ 5 14. 8 15. ≈ 6
 16. ≈ 9 17. 15 18. ≈ 7 19. 13 20. ≈ 10
 21. ≈ 8 22. 20 23. ≈ 11 24. ≈ 9
 25. $\sqrt{85}, \sqrt{26}, \sqrt{98}, \sqrt{40}, \sqrt{18}, \sqrt{5}, \sqrt{68}, \sqrt{29}, \sqrt{37}, \sqrt{75}, \sqrt{54}, \sqrt{103}, \sqrt{61}, \sqrt{119}, \sqrt{84}$

Reteaching 4-9

1. 10 ft 2. 8 m 3. 9 in. 4. 2 km 5. 25 in.
 6. 30 m 7. yes 8. no 9. no 10. yes
 11. yes 12. no

Enrichment 4-1

- | | |
|--------------------------------|--------------------------|
| 1. 1, 2, 3; 6; perfect | 2. 1, 3, 5; 9; deficient |
| 3. 1, 2, 4, 8; 15; deficient | 4. 1; 1; deficient |
| 5. 1, 2, 3, 6, 9; 21; abundant | 6. 1; 1; deficient |
| 7. 1, 2, 4, 5, 10; 22 abundant | 8. 1, 3, 7; 11 deficient |
| 9. 1, 2, 11; 14; deficient | |
| 10. Sample answer: 28 | 11. Sample answer: 24 |
| 12. Sample answer: 23 | |
| 13. 12 + 12 | 14. 12 + 24; 18 + 18 |

Enrichment 4-2

Whole Numbers	Integers	Rational Numbers
4	4	$4, 2\frac{7}{9}$
16	16	$-3\frac{4}{5}$
25	25	$0.\overline{36}$
	250	0.8
	21	$0.\overline{3}$
		$\frac{4}{5}, 2\frac{7}{9}$
		$\frac{4}{11}, -3\frac{8}{10}$
		$-\frac{1}{2}, \frac{250}{5}$
		$\frac{4}{12}$

- 2a. $-\frac{250}{5}, -50$ 2b. $-3\frac{4}{5}, -3\frac{8}{10}$ 2c. $\frac{4}{12}, 0.\overline{3}$
 2d. $\frac{4}{11}, 0.\overline{36}$ 2e. $\frac{4}{5}, 0.8$ 2f. $2\frac{7}{9}, 2.\overline{7}$

Chapter 4 Answers

Practice 4-1

1. 1, 2, 3, 4, 6, 9, 12, 18, 36
2. 1, 2, 3, 6, 7, 14, 21, 42
3. 1, 2, 5, 10, 25, 50
4. 1, 41
5. no
6. yes
7. yes
8. no
9. yes
10. no
11. no
12. yes
13. composite; 2; 37
14. prime
15. prime
16. composite; 3; 17
17. prime
18. composite; 7; 13
19. prime
20. prime
21. $2 \cdot 5 \cdot 7$
22. $2^2 \cdot 23$
23. $2^3 \cdot 3 \cdot 5$
24. $2 \cdot 59$
25. $2^3 \cdot 5^2$
26. $2^2 \cdot 3^2 \cdot 5$
27. $2^3 \cdot 3^2 \cdot 5$
28. $2^2 \cdot 5^3$
29. $11 \cdot 17$
30. $2^2 \cdot 7 \cdot 13$
31. $3^2 \cdot 11 \cdot 13$
32. $2 \cdot 3 \cdot 11 \cdot 17$
33. 8
34. 2
35. 7
36. 24
37. 6
38. 5
39. 30
40. 50
41. 4 people
42. 8 teams

Practice 4-2

1. $\frac{-5}{1}$
2. $\frac{63}{100}$
3. $\frac{-39}{10}$
4. $\frac{29}{6}$
5. $\frac{7}{9}$
6. $\frac{-3}{8}$
7. $\frac{-7}{13}$
8. $\frac{13}{7}$
9. $\frac{3}{8}$
10. 0.333
11. -0.429
12. -0.667
13. 1.857
14. 3.167
15. -4.875
16. 3.917
17. 5.633
18. -4.636
19. 3.056
20. -1.389
21. 2.417
22. -2.778
23. 5.467
24. -4.933
25. 3.727
26. $\frac{3}{500}$
27. $\frac{-4\frac{8}{9}}{9}$
28. $\frac{97}{100}$
29. $\frac{53}{99}$
30. $\frac{4}{9}$
31. $9\frac{1}{20}$
32. $\frac{7}{25}$
33. $5\frac{206}{333}$
34. $3\frac{41}{500}$
35. $-1\frac{41}{99}$
36. $4\frac{23}{99}$
37. $17\frac{1}{3}$
38. $8\frac{5}{99}$
39. $-3\frac{1}{45}$
40. $7\frac{2}{15}$
41. $\frac{2}{9}$
42. $\frac{1}{5}$
43. $\frac{1}{8}$

Practice 4-3

1. $\frac{3}{5}$
2. $\frac{4}{5}$
3. $\frac{1}{3}$
4. $\frac{1}{4}$
5. $\frac{9}{15}$
6. $\frac{7}{10}$
7. $\frac{4}{9}$
8. $\frac{8}{12}$
9. $\frac{2}{5}$
10. $\frac{4}{6}$
11. $\frac{8}{9}$
12. $\frac{3}{6}$
13. $\frac{4}{5}$
14. $\frac{1}{2}$
15. $\frac{1}{7}$
16. Jackie Joyner-Kersee, Inessa Kravets, Heike Drechsler
17. $>$
18. $=$
19. $>$
20. $<$
21. $=$
22. $<$
23. $<$
24. $>$
25. $\frac{6}{7}, \frac{3}{4}, 0.74, 0.64$
26. $\frac{16}{32}, 0.45, \frac{2}{5}, \frac{9}{25}$
27. $\frac{7}{8}, \frac{15}{30}, -\frac{5}{8}, -\frac{8}{11}$
28. $\frac{14}{15}, 0.743, \frac{14}{31}, -0.65$
29. $0.95, \frac{11}{15}, \frac{17}{28}, \frac{17}{30}$
30. $0.8, \frac{5}{8}, 0.5, \frac{3}{8}$
31. $\frac{7}{10}, \frac{1}{2}, -0.3, -\frac{3}{4}$
32. $-\frac{1}{2}, -\frac{4}{5}, -\frac{9}{10}, -\frac{17}{18}$

Practice 4-4

1. $1\frac{5}{8}$
2. $1\frac{1}{2}$
3. $-3\frac{3}{8}$
4. $\frac{1}{4}$
5. $\frac{31}{36}$
6. $\frac{-9}{20}$
7. $8\frac{11}{21}$
8. $4\frac{113}{120}$
9. $\frac{-71}{100}$
10. $8\frac{29}{42}$
11. $1\frac{31}{144}$
12. $\frac{19}{24}$
13. $-8\frac{14}{15}$
14. $\frac{29}{36}$
15. $2\frac{17}{60}$
16. $11\frac{2}{5}$
17. $-11\frac{7}{8}$
18. $3\frac{5}{8}$
19. $-5\frac{5}{8}$
20. 1
21. $\frac{1}{16}$
22. $-\frac{5}{8}$
23. $-\frac{3}{5}$
24. $\frac{1}{2}$
25. $1\frac{1}{10}$
26. $-1\frac{2}{3}$
27. $-\frac{5}{6}$
28. 3.5
29. 2.46
30. $-2\frac{3}{8}$
31. $20\frac{5}{16}$ in.

Practice 4-5

1. $\frac{-11}{24}$
2. $-1\frac{1}{2}$
3. $4\frac{3}{7}$
4. $\frac{-67}{144}$
5. -32
6. $1\frac{13}{25}$
7. $33\frac{29}{32}$
8. $-1\frac{1}{10}$
9. $-30\frac{1}{4}$
10. $\frac{-16}{225}$
11. -4
12. $\frac{-23}{30}$
13. $7\frac{2}{3}$
14. $\frac{-1}{4}$
15. -63
16. -41
17. -30
18. $-2\frac{11}{40}$
19. $-19\frac{1}{6}$
20. $\frac{8}{33}$
21. $3\frac{1}{2}$
22. $\frac{9}{10}$
23. -12
24. $-5\frac{1}{3}$
25. $-4\frac{1}{2}$
26. -20
27. $-1\frac{1}{4}$
28. $-4\frac{4}{5}$
29. $\frac{-4}{81}$
30. $\frac{-5}{22}$
31. 3 recipes
32. 4 packages
33. 7 pizzas

Practice 4-6

1. $P = 2l + 2w; A = l \cdot w; P = 33.2 \text{ cm}; A = 67.2 \text{ cm}^2$
2. $P = a + b + c; A = \frac{1}{2}b \cdot h; P = 35 \text{ cm}; A = 58.5 \text{ cm}^2$
3. $P = 2a + 2b; A = bh; P = 72 \text{ in.}; A = 294 \text{ in.}^2$
4. $P = a + b + c + d; A = \frac{1}{2}h(b_1 + b_2); P = 90 \text{ m}; A = 442 \text{ m}^2$
5. $8s = 400; 50 \text{ mi/h}$
6. $4.5 \times 515 = d; 2,317.5 \text{ mi}$
7. $12t = 18; 1.5 \text{ h}$
8. 32°F
9. 212°F
10. -20°C
11. 25°C

Practice 4-7

1. \$165
2. 9:45 A.M.
3. 6
4. 7:15 A.M.
5. 192 in., or 16 ft
6. 60
7. \$100
8. 72 planters

Practice 4-8

1. 9
2. 8.7
3. 11
4. 17
5. 11.4
6. 2.8
7. 12
8. 12.6
9. 13.5
10. 16
11. 17.3
12. 18.7
13. 19
14. 20.2
15. 21
16. 22.4
17. rational
18. irrational
19. rational
20. irrational
21. rational
22. irrational
23. rational
24. irrational
25. irrational
26. rational
27. irrational
28. rational
29. rational
30. rational
31. rational
32. irrational
33. rational
34. rational
35. rational
36. irrational
37. rational
38. 2.2
39. 2
40. 1.7
41. 15.7
42. 4.6
43. 7.1

Add Decimals

Example

Find the value of $0.512 + 2.88$.

- STEP 1** Rewrite the problem vertically. Carefully align the decimal points. Write a zero at the end of 2.88 as a placeholder.

$$\begin{array}{r} 0.512 \\ + 2.880 \\ \hline \end{array}$$

- STEP 2** Start from the right side. Add the digits in the thousandths place.

$$2 \text{ thousandths} + 0 \text{ thousandths} = 2 \text{ thousandths}$$

$$\begin{array}{r} 0.512 \\ + 2.880 \\ \hline 2 \end{array}$$

- STEP 3** Add the digits in the hundredths place.

$$1 \text{ hundredth} + 8 \text{ hundredths} = 9 \text{ hundredths}$$

$$\begin{array}{r} 0.512 \\ + 2.880 \\ \hline 92 \end{array}$$

- STEP 4** Add the digits in the tens place. Because the sum 13 is > 9 , regroup the tenths.

$$5 \text{ tenths} + 8 \text{ tenths} = 1 \text{ one } 3 \text{ tenths}$$

- STEP 5** Place the decimal point in the answer. Add the digits in the ones place.

$$1 \text{ one} + 0 \text{ ones} + 2 \text{ ones} = 3 \text{ ones}$$

$$\begin{array}{r} 0.512 \\ + 2.880 \\ \hline 392 \end{array}$$

$$\begin{array}{r} 0.512 \\ + 2.880 \\ \hline 3.392 \end{array}$$

Quick Check

Add.

1 $8.7 + 12.23$

2 $43.407 + 3.91$

3 $0.82 + 4.225$

Practice on Your Own

Add.

4 $15.62 + 0.808$

5 $10.05 + 5.55$

6 $42.62 + 9.7$

7 $0.028 + 18.99$

8 $4.2 + 2.05$

9 $8.1 + 16.9$

Subtract Decimals

Example

Find the value of $5.702 - 4.61$.

STEP 1 Rewrite the problem vertically, aligning the decimal points.

Write a zero at the end of 4.61 as a placeholder.

$$\begin{array}{r} 5.702 \\ - 4.610 \\ \hline \end{array}$$

STEP 2 Start from the right side. Subtract the digits in the thousandths place.

$2 \text{ thousandths} - 0 \text{ thousandths} = 2 \text{ thousandths}$

$$\begin{array}{r} 5.702 \\ - 4.610 \\ \hline 2 \end{array}$$

STEP 3 Regroup 1 tenth as 10 hundredths. Subtract the digits in the hundredths place.

$10 \text{ hundredths} - 1 \text{ hundredth} = 9 \text{ hundredths}$

$$\begin{array}{r} 5.\overset{10}{7}02 \\ - 4.610 \\ \hline 92 \end{array}$$

STEP 4 Subtract the digits in the tens place.

$6 \text{ tenths} - 6 \text{ tenths} = 0 \text{ tenths}$

$$\begin{array}{r} 5.\overset{10}{7}02 \\ - 4.610 \\ \hline 092 \end{array}$$

STEP 5 Place the decimal point in the answer. Subtract the digits in the ones place.

$5 \text{ ones} - 4 \text{ ones} = 1 \text{ ones}$

$$\begin{array}{r} 5.\overset{10}{7}02 \\ - 4.610 \\ \hline 1.092 \end{array}$$

Quick Check

Subtract.

1 $30.5 - 2.4$

2 $19.25 - 11.05$

3 $22.4 - 0.05$

Practice on Your Own

Subtract.

4 $1.6 - 0.99$

5 $43.6 - 29.57$

6 $3.16 - 0.28$

7 $11 - 6.43$

8 $67.48 - 66.86$

9 $15.78 - 3.3$

Multiply Decimals

Example

Find the value of $9.27 \cdot 6$.

STEP 1 Rewrite the problem vertically. Do not align digits by place value.

$$\begin{array}{r} 9.27 \\ \times \quad 6 \\ \hline \end{array}$$

STEP 2 Multiply the numbers as you would multiply whole numbers.

Multiply 6 times the hundredths digit, 7. Regroup 40 hundredths as 4 tenths.

$$\begin{array}{r} 9.27 \\ \times \quad 6 \\ \hline \quad \quad 4 \\ \quad \quad 2 \end{array}$$

$$7 \cdot 6 = 42 \quad 4 \text{ tenths and } 2 \text{ hundredths}$$

STEP 3 Multiply 6 times the tenths digit, 2. Add the regrouped 4 tenths. Regroup 10 tenths as 1 one.

$$\begin{array}{r} 9.27 \\ \times \quad 6 \\ \hline \quad \quad \quad 6 \\ \quad \quad \quad 2 \end{array}$$

$$2 \cdot 6 = 12; 12 + 4 = 16 \quad 1 \text{ one and } 6 \text{ tenths}$$

STEP 4 Multiply 6 times the ones digit, 9. Add the regrouped 1 one.

$$\begin{array}{r} 9.27 \\ \times \quad 6 \\ \hline \quad \quad \quad \quad 6 \\ \quad \quad \quad \quad 2 \end{array}$$

$$9 \cdot 6 = 54; 54 + 1 = 55.$$

STEP 5 Count the total number of digits to the right of the decimal point in the two factors. $2 + 0 = 2$, so the product must have 2 digits to the right of the decimal point.

$$\begin{array}{r} 9.27 \\ \times \quad 6 \\ \hline \quad \quad \quad \quad 6 \\ \quad \quad \quad \quad 2 \end{array}$$

$$55.62$$

Quick Check**Multiply.**

1 $5 \cdot 0.9$

2 $4.23 \cdot 9$

3 $0.865 \cdot 3$

Practice on Your Own**Multiply.**

4 $7 \cdot 2.08$

5 $10.75 \cdot 2$

6 $1.035 \cdot 4$

7 $0.028 \cdot 3$

8 $6 \cdot 5.41$

9 $3.99 \cdot 7$

Divide Decimals

Example

Find the value of $7.68 \div 8$.

STEP 1 Rewrite the problem for long division.

$$8 \overline{) 7.68}$$

STEP 2 Place a decimal point in the quotient directly above the decimal point in the dividend.

$$8 \overline{) 7.68}$$

STEP 3 Divide the numbers as you would divide whole numbers, looking at each digit from left to right. You cannot divide 7 ones by 8.
Write a zero in the quotient above the 7.

$$8 \overline{) 7.68}$$

STEP 4 Move to the next place to the right and divide.

$$8 \overline{) 7.68}$$

$$76 \text{ tenths} \div 8 = .9 \text{ tenths R } 4 \text{ tenths}$$

$$\begin{array}{r} 0.9 \\ 8 \overline{) 7.68} \\ -72 \\ \hline 4 \end{array}$$

STEP 5 Bring down the 8 hundredths and continue dividing.

$$8 \overline{) 7.68}$$

$$48 \text{ hundredths} \div 8 = 6 \text{ hundredths}$$

$$\begin{array}{r} 0.96 \\ 8 \overline{) 7.68} \\ -72 \\ \hline 48 \end{array}$$

$$\text{So, } 7.68 \div 8 = 0.96.$$

$$\begin{array}{r} 0.96 \\ 8 \overline{) 7.68} \\ -72 \\ \hline 48 \\ -48 \\ \hline 0 \end{array}$$

Quick Check

Divide.

1 $11.2 \div 7$

2 $8.12 \div 4$

3 $0.85 \div 5$

Practice on Your Own
Divide.

4 $7.08 \div 2$

5 $4.32 \div 6$

6 $0.508 \div 4$

7 $22.5 \div 9$

8 $7.47 \div 3$

9 $0.528 \div 6$

Skill 37**Quick Check**

1. $|2| = 2$ 2. $|-6| = 6$ 3. $|-7| = 7$

Practice on Your Own

- | | |
|------------------|-----------------|
| 4. $ 1 = 1$ | 5. $ -5 = 5$ |
| 6. $ -4 = 4$ | 7. $ 8 = 8$ |
| 8. $ 9 = 9$ | 9. $ 6 = 6$ |
| 10. $ -9 = 9$ | 11. $ 12 = 12$ |
| 12. $ -8 = 8$ | 13. $ 11 = 11$ |
| 14. $ -15 = 15$ | 15. $ 0 = 0$ |

Skill 38**Quick Check**

1. 9 in. 2. 30 ft 3. 25 m

Practice on Your Own

1. 16 cm 2. 22 ft 3. 31 mm

Skill 39**Quick Check**

1. 10 square inches or 10 in^2
 2. 30 square yards or 30 yd^2
 3. 90 square millimeters or 90 mm^2

Practice on Your Own

4. 66 square meters or 66 m^2
 5. 77 square ft or 77 ft^2
 6. 164.7 square yards or 164.7 yd^2

Skill 40**Quick Check**

1. 36 square feet or 36 ft^2
 2. 100 square miles or 100 mi^2
 3. 144 square centimeters or 144 cm^2

Practice on Your Own

4. 625 square centimeters or 625 cm^2
 5. 90.25 square inches or 90.25 in^2
 6. 441 square millimeters or 441 mm^2
 7. 213.16 square feet or 213.16 ft^2

Skill 41**Quick Check**

1. trapezoid; \overline{QT} and \overline{RS}
 2. rhombus; \overline{BE} and \overline{CD} , \overline{BC} and \overline{ED}
 3. parallelogram; \overline{WZ} and \overline{XY} , \overline{WX} and \overline{ZY}

Practice on Your Own

4. rhombus; \overline{GJ} and \overline{HI} , \overline{GH} and \overline{JI}
 5. trapezoid; \overline{SV} and \overline{TU}
 6. parallelogram; \overline{DG} and \overline{EF} , \overline{DE} and \overline{GF}

Skill 42**Quick Check**

1. 20.93 2. 47.317 3. 5.045

Practice on Your Own

4. 16.428 5. 15.6 6. 52.32
 7. 19.018 8. 6.25 9. 25

Skill 43**Quick Check**

1. 28.1 2. 8.2 3. 22.35

Practice on Your Own

4. 0.61 5. 14.03 6. 2.88
 7. 4.57 8. 0.62 9. 12.48

Skill 44**Quick Check**

1. 4.5 2. 38.07 3. 2.595

Practice on Your Own

4. 14.56 5. 21.50 6. 4.14
 7. 0.084 8. 32.46 9. 27.93

Skill 45**Quick Check**

1. 1.6 2. 2.03 3. 0.17

Practice on Your Own

4. 3.54 5. 0.72 6. 0.127
 7. 2.5 8. 2.49 9. 0.088

Skill 46**Quick Check**

1. 31 2. 43 3. 22

Practice on Your Own

4. 7 5. 30 6. 3
 7. 31 8. 18 9. 66

Skill 47**Quick Check**

1. 3.6 2. 25.4 3. 18.9

Multiply Decimals

Example 1

First multiply. Then count the number of decimal places in the original numbers. Place the decimal point so that the product has the same number of decimal places.

$$\begin{array}{r} 42.6 \leftarrow 1 \text{ decimal place} \\ \times 2.3 \leftarrow +1 \text{ decimal place} \\ \hline 1278 \\ + 8520 \\ \hline 97.98 \leftarrow 2 \text{ decimal places} \end{array}$$

Example 2

$$\text{Find } 5.15 \cdot 3.7.$$

First multiply. Then place the decimal point.

$$\begin{array}{r} 5.15 \leftarrow 2 \text{ decimal places} \\ \times 3.7 \leftarrow +1 \text{ decimal place} \\ \hline 3605 \\ + 15450 \\ \hline 19.055 \leftarrow 3 \text{ decimal places} \end{array}$$

Quick Check

Multiply. Express your answer in its simplest form.

1 $6.4 \cdot 11.3$

2 $8.3 \cdot 10.1$

3 $4.52 \cdot 2.9$

Practice on Your Own

Multiply. Express your answer in its simplest form.

4 $12.33 \cdot 2.1$

5 $3.5 \cdot 8.02$

6 $15.4 \cdot 2.7$

7 $9.6 \cdot 0.75$

8 $13.63 \cdot 5.6$

9 $7.8 \cdot 3.9$

10 $6.05 \cdot 7.2$

11 $12.98 \cdot 6.4$

12 $34 \cdot 5.6$

13 $15.4 \cdot 0.17$

14 $18.92 \cdot 0.1$

15 $8.5 \cdot 10.5$

Divide Decimals

Example 1

Find $14.5 \div 2.5$.

$$14.5 \div 2.5 = \frac{14.5}{2.5}$$

$$= \frac{14.5}{2.5} \cdot \frac{10}{10}$$

Rewrite division as a fraction.

Make the denominator a whole number by multiplying it by a power of 10. Multiply the numerator too.

$$= \frac{145}{25}$$

Simplify the fraction.

$$= 5.8$$

Divide as you would with whole numbers.

Example 2

Find $31.71 \div 3.02$.

$$31.71 \div 3.02 = \frac{31.71}{3.02}$$

$$= \frac{31.71}{3.02} \cdot \frac{100}{100}$$

Rewrite division as a fraction.

Make the denominator a whole number by multiplying it by a power of 10. Multiply the numerator too.

$$= \frac{3,171}{302}$$

$$= 5.8$$

Simplify the fraction.

Divide as you would with whole numbers.


Quick Check

Divide. Express your answer in its simplest form.

1 $36.45 \div 8.1$

2 $91.14 \div 2.17$

3 $9.225 \div 0.75$

4 $2.31 \div 0.15$

5 $38.54 \div 8.2$

6 $15.4 \div 2.75$

7 $3.6 \div 0.75$

8 $22.54 \div 2.45$

9 $7.98 \div 0.6$

10 $0.205 \div 4.1$

11 $12.98 \div 4.4$

12 $34.83 \div 8.6$

13 $9.1 \div 2.8$

14 $46.92 \div 5.1$

15 $18.96 \div 0.8$

**Quick Check**

1. 12

2. 4

3. 0

Practice on Your Own

4. 55

5. 8

6. 27

7. 62

8. 7

9. 0

10. 1

11. 6

12. 69

13. 57

14. 13

15. 111

Skill 9**Quick Check**1. $1\frac{1}{2}$ 2. $1\frac{7}{12}$ 3. $3\frac{2}{3}$ 4. $\frac{43}{9}$ 5. $\frac{44}{7}$ 6. $\frac{53}{10}$ **Practice on Your Own**7. $1\frac{1}{3}$ 8. $4\frac{4}{5}$ 9. $1\frac{4}{7}$ 10. $2\frac{3}{4}$ 11. $1\frac{2}{11}$

12. 3

13. $2\frac{4}{5}$ 14. $3\frac{1}{5}$ 15. $7\frac{1}{2}$ 16. $\frac{16}{7}$ 17. $\frac{31}{9}$ 18. $\frac{31}{6}$ 19. $\frac{77}{12}$ 20. $\frac{8}{7}$ 21. $\frac{26}{9}$ 22. $\frac{38}{9}$ 23. $\frac{61}{8}$ 24. $\frac{60}{7}$ **Skill 10****Quick Check**1. $7\frac{17}{20}$ 2. $4\frac{1}{9}$ 3. $\frac{13}{35}$ **Practice on Your Own**4. $4\frac{13}{28}$ 5. $8\frac{43}{72}$ 6. $7\frac{14}{40}$ 7. $7\frac{29}{35}$ 8. $1\frac{11}{36}$ 9. $3\frac{1}{10}$ **Skill 11****Quick Check**1. $\frac{3}{5}$ 2. $\frac{10}{21}$ 3. $\frac{1}{16}$ **Practice on Your Own**4. $\frac{1}{3}$ 5. $\frac{1}{21}$ 6. $\frac{2}{3}$ 7. $\frac{3}{50}$ 8. $\frac{3}{10}$ 9. $\frac{16}{27}$ 10. $\frac{21}{55}$ 11. $\frac{1}{7}$ 12. $\frac{5}{16}$ **Skill 12****Quick Check**1. $\frac{3}{4}$ 2. $\frac{1}{2}$ 3. $2\frac{4}{7}$ **Practice on Your Own**4. $1\frac{3}{5}$ 5. $\frac{1}{9}$ 6. $\frac{5}{6}$ 7. $1\frac{1}{2}$ 8. $\frac{9}{25}$ 9. $1\frac{3}{7}$ 10. $1\frac{1}{15}$ 11. $2\frac{1}{10}$ 12. $1\frac{7}{18}$ **Skill 13****Quick Check**

1. 72,32

2. 83,83

3. 13,108

Practice on Your Own

4. 25,893

5. 28,07

6. 41,58

7. 7,2

8. 76,328

9. 30,42

10. 43,56

11. 83,072

12. 190,4

13. 2,618

14. 1,892

15. 89,25

Skill 14**Quick Check**

1. 4,5

2. 42

3. 12,3

Practice on Your Own

4. 15,4

5. 4,7

6. 5,6

7. 4,8

8. 9,2

9. 13,3

10. 0,05

11. 2,95

12. 4,05

13. 3,25

14. 9,2

15. 23,7

Skill 15**Quick Check**

1. 12

2. 36%

3. (a) 63

(b) 60%

Practice on Your Own

4. 80

5. 27,5%

6. \$49

7. 5%

8. (a) 30 pounds

(b) 750%

Reteaching 5-1**Ratios and Rates**

A *ratio* is a comparison between two quantities. Suppose that an apple pie is cut into 12 pieces. 8 are to be served hot and 4 are to be served cold. Two possible ratios are:

$$\text{hot} = \frac{8}{4} \text{ (part)} \quad \text{total} = \frac{8}{12} \text{ (whole)}$$

Example 1: Write the ratios in simplest form.

$$\frac{8}{4} = \frac{8 \div 4}{4 \div 4} = \frac{2}{1} \quad \frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

A *rate* compares two different types of quantities. To find a unit rate, divide both the numerator and the denominator by the denominator.

Example 2: Find the unit rate for 150 miles in 6 hours.

$$\begin{aligned} \textcircled{1} & \text{ Compare.} & \text{miles} &= \frac{150}{6} \\ \textcircled{2} & \text{ Divide.} & &= \frac{150 \div 6}{6 \div 6} \\ \textcircled{3} & \text{ Simplify.} & &= \frac{25}{1} \end{aligned}$$

The unit rate is 25 miles per hour, or 25 mi/h.

Write each ratio in simplest form.

1. 8 in. to 10 in.

2. $\frac{16 \text{ cm}}{12 \text{ cm}}$

3. 15 m : 18 m

4. $\frac{16 \text{ yd}}{24 \text{ yd}}$

5. 30 ft : 10 ft

6. $\frac{9 \text{ mi}}{15 \text{ mi}}$

7. $\frac{12 \text{ ft}}{28 \text{ ft}}$

8. 12 cm to 9 cm

9. 6 m : 16 m

10. 18 km to 10 km

11. $\frac{8 \text{ cm}}{15 \text{ cm}}$

12. 30 in. : 35 in.

Use a calculator, paper and pencil, or mental math to find each unit rate.

13. \$3.75 for 3 pounds of bird seed

14. 270 miles for 12 gallons of gas

15. 45 minutes for 15 songs

16. \$10.50 for 3 pairs of socks

17. 72 plants in 9 planters

18. 192 jars in 8 cases

19. 3 pounds of cheese for 4 pizzas

20. 270 miles in 6 hours

Reteaching 5-4**Solving Proportions**

A proportion states that two ratios are equal. To solve a proportion that contains a variable, find a value of the variable that makes the statement true. Use *cross products*.

Example 1: Solve the proportion $\frac{3}{4} = \frac{n}{20}$.

- ① Write the proportion. $\frac{3}{4} = \frac{n}{20}$
- ② Use cross products. $3 \cdot 20 = 4 \cdot n$
- ③ Solve. $60 = 4n$
 $15 = n$

When you write a proportion, remember that matching terms in the ratios should represent the same thing.

Example 2: Minh makes bouquets having 4 roses out of 7 flowers. How many roses are there out of 14 flowers?

- ① Write the proportion. $\frac{4}{7} = \frac{n}{14}$ (roses)
(flowers)
- ② Use cross products. $4 \cdot 14 = 7n$
- ③ Solve. $56 = 7n$
 $8 = n$

There are 8 roses out of 14 flowers.

Solve each proportion.

1. $\frac{5}{3} = \frac{n}{6}$

30 = _____

n = _____

4. $\frac{5}{7} = \frac{w}{21}$

105 = _____

w = _____

2. $\frac{s}{4} = \frac{7}{2}$

2s = _____

s = _____

5. $\frac{b}{10} = \frac{6}{15}$

15b = _____

b = _____

3. $\frac{15}{12} = \frac{5}{y}$

15y = _____

y = _____

6. $\frac{9}{12} = \frac{3}{n}$

9n = _____

n = _____

Write a proportion for each situation. Then solve.

7. Eight out of 10 fish are trout. How many trout are there out of 40 fish?

8. There is 1 robin for every 5 birds. How many robins are there for 15 birds?

9. Two flowers cost \$.66. How much does 1 flower cost?

Chapter 5 Answers (continued)

Reteaching 5-1

1. 4 to 5
2. $\frac{4}{3}$
3. 5 : 6
4. $\frac{2}{3}$
5. 3 : 1
6. $\frac{3}{5}$
7. $\frac{3}{7}$
8. 4 to 3
9. 3 : 8
10. 9 to 5
11. $\frac{8}{15}$
12. 6 : 7
13. \$1.25/lb
14. 22.5 mi/gal
15. 3 min/song
16. \$3.50/pair
17. 8 plants/planter
18. 24 jars/case
19. 0.75 lb/pizza
20. 45 mi/h

Reteaching 5-2

1. ounce
2. quart
3. inch
4. kilometer
5. gram
6. liter
7. 4
8. 84
9. 6,000
10. 60
11. 33
12. 6

Reteaching 5-3

1. 640 oz bleach and 256 oz water
2. 9 lb of cement and 18 lb of sand
3. 3 qt of concentrate and 9 qt of water.

Reteaching 5-4

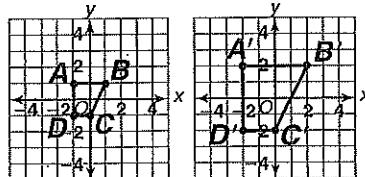
1. $3n$; 10
2. 28; 14
3. 60; 4
4. $7w$; 15
5. 60; 4
6. 36; 4
7. $\frac{8}{10} = \frac{n}{40}$; 32 trout
8. $\frac{1}{5} = \frac{n}{15}$; 3 robins.
9. $\frac{2}{0.66} = \frac{1}{n}$; \$.33

Reteaching 5-5

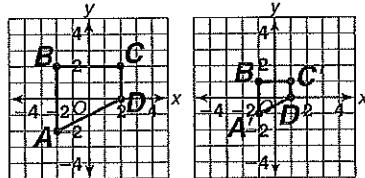
1. no
2. yes $\triangle ABC \sim \triangle XYZ$
3. no
4. $n = \frac{2}{3}$
5. $n = 9$
6. $n = 3$

Reteaching 5-6

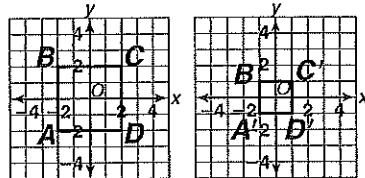
1. enlargement



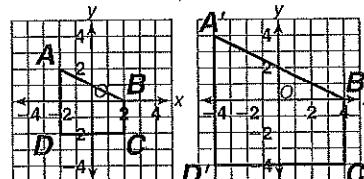
2. reduction



3. reduction



4. enlargement



Reteaching 5-7

1. $\frac{\frac{5}{2}}{\frac{1}{1}} = \frac{10}{h}$; 4 ft
2. $\frac{\frac{9}{2}}{\frac{1}{1}} = \frac{27}{l}$; 6 ft
3. $\frac{\frac{4}{1}}{\frac{1}{1}} = \frac{12}{h}$; $3\frac{1}{3}$ ft
4. $\frac{\frac{7}{2}}{\frac{1}{1}} = \frac{28}{l}$; 8 ft
5. $\frac{\frac{7}{2}}{\frac{1}{1}} = \frac{10\frac{1}{2}}{l}$; 3 ft
6. $\frac{\frac{3}{2}}{\frac{1}{1}} = \frac{24}{l}$; $\frac{3}{w}$; 12 ft by 16 ft

Reteaching 5-8

1. $h = 10$ ft
2. $h = 12$ ft
3. 12 ft
4. 5.5 ft
5. 95 ft
6. 18 ft

Reteaching 5-9

1. $\frac{4}{5}$
2. $\frac{3}{5}$
3. $\frac{3}{5}$
4. $\frac{4}{5}$
5. 0.5299
6. 0.5592
7. 0.9511
8. 0.9063
9. 65.8

Enrichment 5-1

1. 1, 2, 4, 8, 16, 32, 64
2. 2 to 1
3. 1, 3, 9, 27, 81, 243, 729
4. 3 to 1
- 5a. 3
- 5b. 18
- 5c. 108
- 5d. 648
- 5e. 3,888
- 5f. 23,328
6. Sample answer: The base numbers are 2 and 3. The exponent for 2 is one less than the exponent for 3.
7. b : a: 18 : 3, or 6 : 1; c : b: 108 : 18, or 6 : 1; d : c: 648 : 108, or 6 : 1; e : d: 3,888 : 648, or 6 : 1; f : e: 23,328 : 3,888, or 6 : 1
8. Sample answer: The ratio is 6 : 1 for each pair. Six is the product of the base numbers 2 and 3.
9. Sample answer: 15 : 1; 15 is the product of the base numbers 3 and 5. The prediction is valid.

Enrichment 5-2

1. There are 3.45 miles in one league.
2. 20,000 leagues
3. $20,000 \text{ leagues} \times \frac{3.45 \text{ miles}}{1 \text{ league}} \approx 69,000 \text{ miles}$
4. The answer will be greater than 20,000 because there are 3.45 miles per one league, so you multiply 20,000 by 3.45.
5. 69,000 miles
6. 5,280 feet
7. $69,000 \text{ miles} \times \frac{5,280 \text{ feet}}{1 \text{ mile}} \approx 364,320,000 \text{ feet}$
8. 364,320,000 feet
9. Three Hundred Sixty-Four Million, Three Hundred Twenty Thousand Feet Under the Sea.
10. $20,000 \times 4 = 80,000$; $80,000 \times 5,000 = 400,000,000$
11. 30,193 leagues

Practice 5-4**Solving Proportions****Solve each proportion.**

1. $\frac{3}{8} = \frac{m}{16}$ _____

2. $\frac{9}{4} = \frac{27}{x}$ _____

3. $\frac{18}{6} = \frac{j}{1}$ _____

4. $\frac{b}{18} = \frac{7}{6}$ _____

5. $\frac{12}{q} = \frac{3}{4}$ _____

6. $\frac{3}{2} = \frac{15}{r}$ _____

7. $\frac{5}{x} = \frac{25}{15}$ _____

8. $\frac{80}{20} = \frac{4}{n}$ _____

Estimate the solution of each proportion.

9. $\frac{m}{25} = \frac{16}{98}$ _____

10. $\frac{7}{3} = \frac{52}{n}$ _____

11. $\frac{30}{5.9} = \frac{k}{10}$ _____

12. $\frac{2.8}{j} = \frac{1.3}{2.71}$ _____

13. $\frac{y}{12} = \frac{2.89}{4.23}$ _____

14. $\frac{5}{8} = \frac{b}{63}$ _____

15. $\frac{9}{4} = \frac{35}{d}$ _____

16. $\frac{c}{7} = \frac{28}{50}$ _____

Solve each proportion.

17. $\frac{4}{5} = \frac{b}{40}$ _____

18. $\frac{11}{7} = \frac{88}{c}$ _____

19. $\frac{x}{1.4} = \frac{28}{5.6}$ _____

20. $\frac{0.99}{a} = \frac{9}{11}$ _____

21. $\frac{42.5}{20} = \frac{x}{8}$ _____

22. $\frac{15}{25} = \frac{7.5}{y}$ _____

23. $\frac{16}{b} = \frac{56}{38.5}$ _____

24. $\frac{z}{54} = \frac{5}{12}$ _____

25. $\frac{8}{12} = \frac{e}{3}$ _____

26. $\frac{v}{35} = \frac{15}{14}$ _____

27. $\frac{60}{n} = \frac{12}{5}$ _____

28. $\frac{6}{16} = \frac{9}{w}$ _____

29. $\frac{4}{7} = \frac{r}{35}$ _____

30. $\frac{18}{16} = \frac{27}{t}$ _____

31. $\frac{n}{12} = \frac{12.5}{15}$ _____

32. $\frac{27}{f} = \frac{40.5}{31.5}$ _____

33. 5 is to 8 as 15 is to w _____

34. y is to 8 as 22.5 is to 10 _____

35. 14 is to b as 28 is to 18 _____

36. 10 is to 7 as m is to 10.5 _____

37. 30 is to 16 as j is to 8 _____

38. r is to 17 as 81 is to 51 _____

Write a proportion for each situation. Then solve.

39. Jaime paid \$1.29 for three ponytail holders. At that rate, what would eight ponytail holders cost her?

41. Arturo paid \$8 in tax on a purchase of \$200. At that rate, what would the tax be on a purchase of \$150?

40. According to a label, there are 25 calories per serving of turkey lunch meat. How many calories are there in 2.5 servings?

42. Chris drove 200 mi in 4 h. At that rate, how long would it take Chris to drive 340 mi?

Chapter 5 Answers

Practice 5-1

1–3. Sample answers:

1. 2 flowers : 3 leaves; 3 leaves : 2 flowers;
2 flowers : 13 petals
2. 3 hearts : 4 diamonds; 4 diamonds : 7 shapes;
3 hearts : 7 shapes
3. 3 pencils : 2 pens; 2 pens : 3 pencils;
3 pencils : 5 writing implements
4. 3 : 4 5. 4 out of 5 6. 2 to 3 7. $\frac{2}{7}$
8. 20 to 17 9. $\frac{3}{5}$ 10. 1 to 4 11. 1 to 18
12. 1 to 15. 13. \$16.98/gal 14. \$3.50/h 15. 62.5 mi/h
16. 47 words/min 17. \$.99/carnation 18. 3 min/song
19. $\frac{7}{8}; 0.88$ 20. $\frac{8}{7}, 1.14$ 21. $\frac{7}{15}; 0.47$ 22. $\frac{8}{15}; 0.53$
23. 16 oz for \$3.89 24. 4 yellow marbles

Practice 5-2

1. inch 2. ounce 3. quart 4. foot
5. mile 6. ton 7. kilogram 8. meter
9. milliliter 10. centimeter 11. liter
12. gram 13. 4.67 14. 5,760 15. 32
16. 18 17. 4,500 18. 28 19. 360
20. 432 21. 320 22. 352 yd/min
23. 10.56 in./s 24. 350.72 ft/min 25. 146.67 ft/s
26. 10 27. 1

Practice 5-3

1. 32 red jump ropes and 8 blue jump ropes
2. 19 oz of granola and 9 oz of nuts
3. 700 adults and 350 children
4. 10 parts bleach and 40 parts water
5. 41 yellow marbles and 123 green marbles
6. 15 7. 12 yd^2
8. 32¢ stamps : 6 each and 20¢ stamps : 10 each

Practice 5-4

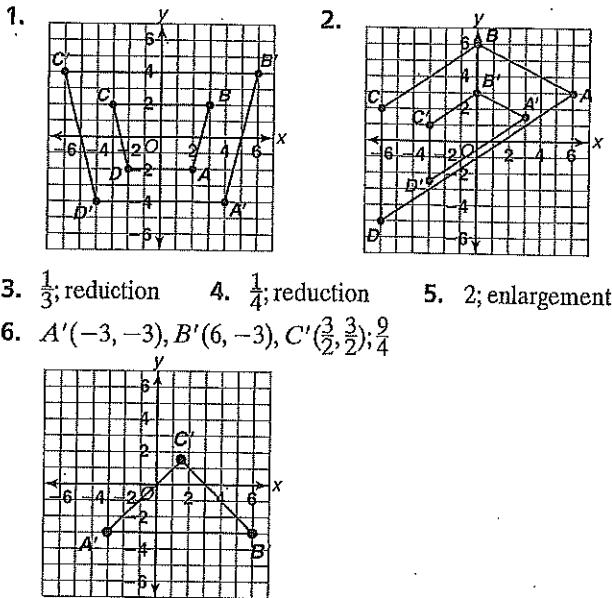
1. 6 2. 12 3. 3 4. 21 5. 16
6. 10 7. 3 8. 1
- 9–16. Sample answers are given.
11. 50 12. 5.6 13. 9 14. 40 15. 16
16. 4 17. 32 18. 56 19. 7 20. 1.21
21. 17 22. 12.5 23. 11 24. 22.5 25. 2
26. 37.5 27. 25 28. 24 29. 20 30. 24
31. 10 32. 21 33. 24 34. 18 35. 9
36. 15 37. 15 38. 27 39. $\frac{1.29}{3} = \frac{x}{8}; \3.44
40. $\frac{25}{1} = \frac{x}{2.5}; 62.5 \text{ calories}$ 41. $\frac{8}{200} = \frac{x}{150}; \6
42. $\frac{200}{4} = \frac{340}{x}; 6.8 \text{ h, or } 6 \text{ h } 48 \text{ min}$

Practice 5-5

1. yes; $ABCD \sim EFGH$
2. no
3. yes; $\triangle STU \sim \triangle VWX$
4. yes; $\triangle DEF \sim \triangle CAB$
5. yes; $GHJ \sim KLMN$
6. no

7. $x = 100; y = 20$
8. $x = 4\frac{2}{3}; y = 8$
9. $x = 18; y = 24$
10. $x = 21; y = 24$
11. $x = 20; y = 9$
12. $x = 21\frac{3}{5}; y = 20$
13. $m = 24; n = 8$
14. $x = 4; y = 4\frac{1}{2}$
15. 65 inches
16. 63 inches

Practice 5-6



Practice 5-7

1. $43\frac{1}{3} \text{ in.}$
2. 6 in.
3. 1 in.: 25 mi
4. \$31.44
5. 14 oz
6. 21.6 cm
7. \$6.12
8. 1 in.: 444.4 ft
9. 9 gal

Practice 5-8

1. 78 ft
2. 62 ft
3. $\approx 13.3 \text{ m}$
4. 68.75 km
5. 32 m
6. 8 ft
7. 5 ft 6 in.
8. 33 ft 4 in.
9. 75 ft
10. $\approx 13.3 \text{ m}$

Practice 5-9

1. $\frac{15}{25} \text{ or } \frac{3}{5}$
2. $\frac{20}{25} \text{ or } \frac{4}{5}$
3. $\frac{20}{25} \text{ or } \frac{4}{5}$
4. $\frac{15}{25} \text{ or } \frac{3}{5}$
5. 0.7431
6. 0.5446
7. 0.3090
8. 0.9511
9. 0.9998
10. 0.0175
11. 0.6018
12. 0.9903
13. 0.8090
14. 0.4695
15. 0.9659
16. 0.9659
17. 12; $\sin X = \frac{4}{5}; \cos X = \frac{3}{5}$
18. 15; $\sin X = \frac{12}{13}; \cos X = \frac{5}{13}$
19. 15; $\sin X = \frac{15}{17}; \cos X = \frac{8}{17}$
20. 140 ft; 38.7 ft
21. 6.7 ft

Reteaching 6-1**Fractions, Decimals, and Percents**

A *percent* is a ratio that compares a number to 100.

- To write a fraction as a percent, find the equivalent fraction with denominator 100. Write the numerator to show the percent.

$$\frac{3}{10} = \frac{3 \cdot 10}{10 \cdot 10} = \frac{30}{100}$$

- To write a decimal as a percent, move the decimal point two places to the right and write the % sign.

$$0.\underline{7}8 = 78\%$$

$$0.\underline{0}54 = 5.4\%$$

$$3.9 = 390\%$$

- To write a percent as a fraction, compare the number to 100, then simplify.

$$40\% = \frac{40}{100} = \frac{2}{5}$$

- To write a percent as a decimal, remove the % sign and move the decimal point two places to the left.

$$34\% = 0.\underline{3}4$$

$$0.9\% = 0.\underline{0}09$$

$$460\% = 4.6$$

Another way to change between a fraction and a percent is to use a decimal as an intermediate step.

Fraction → Decimal → Percent

$$\frac{3}{8} = 3 \div 8 = 0.375 = 37.5\%$$

Percent → Decimal → Fraction

$$250\% = 2.50 = 2\frac{50}{100} = 2\frac{1}{2}$$

Write each decimal as a percent.

1. 0.39 _____

2. 0.08 _____

3. 4.2 _____

4. 0.5 _____

5. 9 _____

6. 0.056 _____

Write each fraction as a percent.

7. $\frac{3}{4}$ _____

8. $\frac{1}{5}$ _____

9. $\frac{7}{10}$ _____

10. $\frac{5}{8}$ _____

11. $\frac{1}{4}$ _____

12. $\frac{3}{5}$ _____

Write each percent as a decimal.

13. 45% _____

14. 90% _____

15. 0.2% _____

16. 150% _____

17. 4% _____

18. 32% _____

Write each percent as a fraction in simplest form.

19. 25% _____

20. 10% _____

21. 68% _____

22. 450% _____

23. 12% _____

24. 375% _____

Practice 6-1**Fractions, Decimals, and Percents****Use mental math to write each decimal as a percent.**

1. 0.95 _____ 2. 0.06 _____ 3. 0.004 _____ 4. 0.27 _____
 5. 0.63 _____ 6. 0.005 _____ 7. 1.4 _____ 8. 2.57 _____

Choose a calculator or a paper and pencil to write each fraction as a percent. Round to the nearest tenth of a percent.

9. $\frac{4}{5}$ _____ 10. $\frac{7}{10}$ _____ 11. $\frac{5}{6}$ _____ 12. $4\frac{1}{2}$ _____
 13. $\frac{5}{8}$ _____ 14. $\frac{1}{15}$ _____ 15. $\frac{9}{25}$ _____ 16. $1\frac{7}{8}$ _____
 17. $\frac{1}{6}$ _____ 18. $\frac{11}{12}$ _____ 19. $\frac{1}{20}$ _____ 20. $3\frac{9}{20}$ _____

Use mental math to write each percent as a decimal.

21. 70% _____ 22. 10% _____ 23. 800% _____ 24. 37% _____
 25. 2.6% _____ 26. 234% _____ 27. 9% _____ 28. $3\frac{1}{2}\%$ _____

Write each percent as a fraction in simplest form.

29. 10% _____ 30. 47% _____ 31. $5\frac{1}{2}\%$ _____ 32. 473% _____
 33. 15% _____ 34. 92% _____ 35. $3\frac{1}{4}\%$ _____ 36. 548% _____
 37. 85% _____ 38. 42% _____ 39. 70% _____ 40. 150% _____

Solve.

41. There are twelve pairs of cranial nerves connected to the brain. Ten of these pairs are related to sight, smell, taste, and sound. What percent of the pairs are related to sight, smell, taste, and sound?

42. If a person weighs 150 lb, then calcium makes up 3 lb of that person's weight. What percent of a person's weight does calcium make up?

43. A quality control inspector found that 7 out of every 200 flashlights produced were defective. What percent of the flashlights were *not* defective?

44. In 1992, 80 varieties of reptiles were on the endangered species list. Eight of these were found only in the United States. What percent of the reptiles on the endangered species list were found only in the United States?

N

Reteaching 6-3**Percents and Proportions**

F

You can use proportions to solve percent problems.

F

Find the part.

Example 1: Find 10% of 92.

- ① Think of the percent as a ratio. $10\% = \frac{10}{100}$
- ② Write a proportion. $\frac{10}{100} = \frac{n}{92}$
- ③ Solve. $100n = 920$
 $\frac{100n}{100} = \frac{920}{100}$
 $n = 9.2$

10% of 92 is 9.2.

Find the whole.

Example 3: 50 is 20% of what number?

- ① Write a proportion. $\frac{50}{n} = \frac{20}{100}$
- ② Solve. $20n = 5,000$
 $\frac{20n}{20} = \frac{5,000}{20}$
 $n = 250$

Find the percent.

Example 2: What percent of 80 is 20?

- ① Write a proportion. $\frac{20}{80} = \frac{n}{100}$
- ② Solve. $80n = 2,000$
 $\frac{80n}{80} = \frac{2,000}{80}$
 $n = 25$

20 is 25% of 80.

Complete the proportion. Then solve each problem.

1. 6 is $n\%$ of 30.

$$\frac{n}{100} = \frac{\square}{\square}$$

$n = \underline{\hspace{2cm}}$

2. 2 is 25% of n .

$$\frac{2}{n} = \frac{\square}{\square}$$

$n = \underline{\hspace{2cm}}$

3. 75% of 80 is n .

$$\frac{\square}{\square} = \frac{n}{80}$$

$n = \underline{\hspace{2cm}}$

4. $n\%$ of 50 is 20.

$$\frac{n}{100} = \frac{\square}{\square}$$

$n = \underline{\hspace{2cm}}$

5. 49 is $n\%$ of 140.

$$\frac{49}{n} = \frac{\square}{\square}$$

$n = \underline{\hspace{2cm}}$

6. 45 is 15% of n .

$$\frac{45}{n} = \frac{\square}{\square}$$

$n = \underline{\hspace{2cm}}$

Use a proportion to solve each problem.

7. Find 50% of 90.

8. Find 75% of 980.

9. 60 is 30% of what number?

Practice 6-3**Percents and Proportions**

Write a proportion that will help you answer the problem. Then solve each problem.

1. What percent is 21 of 50?

2. What is 45% of 72?

3. 83 is 70% of what number?

4. 45 is what percent of 65?

Use a proportion to solve each problem.

5. 78% of 58 is _____. 6. 86 is 12% of _____. 7. 90 is _____ of 65.
8. 40 is 17% of _____. 9. 57 is 31% of _____. 10. 280% of _____ is 418.
11. 53% of 92 is _____. 12. 56 is 25% of _____. 13. 51 is _____ of 14.
14. What percent of 42 is 18?

15. 58 is 40% of what number?

16. What is 70% of 93?

17. 240 is what percent of 150?

18. What percent of 16 is 40?

19. 65 is 60% of what number?

20. What is 175% of 48?

21. 210 is what percent of 70?

22. What percent of 56 is 7?

23. 68 is 50% of what number?

24. What is 63% of 148?

25. 215 is what percent of 400?

Solve.

26. In 1990, the population of El Paso, Texas, was 515,342. Of this population, 69% were of Hispanic origin. How many people were of Hispanic origin?

27. Bangladesh covers 55,598 mi². Of this land, 2,224 mi² are meadows and pastures. What percent of the land is meadow and pasture?

Reteaching 6-4

Percents and Equations

You can use an equation to solve percent problems.

Find the whole.

Example 1: 25% of what number is 20?

- ① Think of the percent as a decimal.

$$25\% = 0.25$$

- ② Write an equation.

$$0.25n = 20$$

- ③ Solve.

$$\begin{aligned} n &= \frac{20}{0.25} \\ &= 80 \end{aligned}$$

25% of 80 is 20.

Find the part.

Example 2: Find 12% of 48.

- ① Think of the percent as a decimal.

$$12\% = 0.12$$

- ② Write an equation.

$$0.12 \times 48 = n$$

- ③ Solve.

$$5.76 = n$$

12% of 48 is 5.76.

Find the percent.

Example 3: What percent of 48 is 30?

- ① Write an equation.

$$n \times 48 = 30$$

- ② Solve.

$$\begin{aligned} n &= \frac{30}{48} \\ &= 0.625 \\ &= 62.5\% \end{aligned}$$

30 is 62.5% of 48.

Use an equation to solve each problem.

1. 30% of what number is 6?

3. What percent of 80 is 20?

5. Find 40% of 90.

7. What is 11% of 99?

9. What is 13% of 56?

2. 32 is 25% of what number?

4. What is 10% of 35?

6. What percent of 60 is 27?

8. 22 is 55% of what number?

10. What percent of 96 is 84?

Practice 6-4**Percents and Equations**

Use an equation to solve each problem. Round to the nearest tenth.

1. What percent of 80 is 25? _____
2. 8.6 is 5% of what number? _____
3. What is 140% of 85? _____
4. 70 is what percent of 120? _____
5. What percent of 90 is 42? _____
6. 18.4 is what percent of 10? _____
7. 56% of what number is 82? _____
8. Find 93% of 150. _____
9. 30% of what number is 120? _____
10. What percent of 420 is 7? _____
11. 79 is what percent of 250? _____
12. 9.1 is 3% of what number? _____
13. What is 94% of 260? _____
14. 45 is what percent of 18? _____
15. What percent of 280 is 157? _____
16. 20.7 is what percent of 8? _____
17. 114% of what number is 75? _____
18. Find 72% of 18,495. _____
19. 75% of what number is 200? _____
20. What percent of 940 is 15? _____
21. 80 is what percent of 450? _____
22. Find 65% of 2,190. _____
23. 90 is what percent of 40? _____
24. 45 is what percent of 900? _____
25. 82 is 90% of what number? _____
26. 50 is 120% of what number? _____

Solve.

27. In a recent survey, 216 people, or 54% of the sample, said they usually went to a family restaurant when they went out to eat. How many people were surveyed?

28. In a school survey, 248 students, or 32% of the sample, said they worked part time during the summer. How many students were surveyed?

29. Juliet sold a house for \$112,000. What percent commission did she receive if she earned \$6,720?

30. Jason earns \$200 per week plus 8% commission on his sales. How much were his sales last week if Jason earned \$328?

31. Stella makes 2% royalties on a book she wrote. How much money did her book earn in sales last year if she made \$53,000 in royalties?

32. Linda earns \$40 base pay per week, plus 10% commission on all sales. What were her sales if she made \$112 in one week?

33. Kevin sold a house for \$57,000. His fee, or sales commission, for selling the house was \$2,679. What percent of the price of the house was Kevin's commission?

34. Marik agreed to pay a realtor 6.5% commission for selling his house. If the house sold for \$68,900, how much does Marik have after paying the realtor's commission?

Chapter 6 Answers (continued)

Reteaching 6-1

- | | | | |
|---------------------|--------------------|--------------------|--------------------|
| 1. 39% | 2. 8% | 3. 420% | 4. 50% |
| 5. 900% | 6. 5.6% | 7. 75% | 8. 20% |
| 9. 70% | 10. 62.5% | 11. 25% | 12. 60% |
| 13. 0.45 | 14. 0.9 | 15. 0.002 | 16. 1.5 |
| 17. 0.04 | 18. 0.32 | 19. $\frac{1}{4}$ | 20. $\frac{1}{10}$ |
| 21. $\frac{17}{25}$ | 22. $4\frac{1}{2}$ | 23. $\frac{3}{25}$ | 24. $3\frac{3}{4}$ |

Reteaching 6-2

1–12. Sample answers are given.

- | | | | | |
|---------|---------|-------|-------|---------|
| 1. 7 | 2. 30 | 3. 30 | 4. 12 | 5. 8 |
| 6. 4 | 7. 6.8 | 8. 8 | 9. 3 | 10. 105 |
| 11. 1.5 | 12. 200 | | | |

13–18. Sample answers are given.

- | | | | | |
|------------|------------|------------|------------|------------|
| 13. \$1.50 | 14. \$6.00 | 15. \$5.00 | 16. \$7.50 | 17. \$3.00 |
| 18. \$1.80 | | | | |

Reteaching 6-3

- | | | |
|---------------|----------------|-----------------|
| 1. 6; 30; 20 | 2. 25; 100; 8 | 3. 75; 100; 60 |
| 4. 20; 50; 40 | 5. 49; 140; 35 | 6. 15; 100; 300 |
| 7. 45 | 8. 735 | 9. 200 |

Reteaching 6-4

- | | |
|------------------------------------|------------------------------------|
| 1. $0.30n = 6; n = 20$ | 2. $0.25n = 32; n = 128$ |
| 3. $n \times 80 = 20; n = 25\%$ | 4. $0.10 \times 35 = n; n = 3.5$ |
| 5. $0.40 \times 90 = n; n = 36$ | 6. $n \times 60 = 27; n = 45\%$ |
| 7. $0.11 \times 99 = n; n = 10.89$ | 8. $0.55n = 22; n = 40$ |
| 9. $0.13 \times 56 = n; n = 7.28$ | 10. $n \times 96 = 84; n = 87.5\%$ |

Reteaching 6-5

- | | | | |
|-----------|-----------|-----------|----------|
| 1. 25% | 2. 50% | 3. 20% | 4. 30.4% |
| 5. 12.1% | 6. 44% | 7. 13.3% | 8. 38.7% |
| 9. 34.4% | 10. 20% | 11. 33.9% | 12. 50% |
| 13. 28.3% | 14. 78.5% | 15. 33.3% | |

Reteaching 6-6

- | | | | |
|-------------|-------------|-------------|------------|
| 1. \$24 | 2. \$109.99 | 3. \$142.50 | 4. \$400 |
| 5. \$20.39 | 6. \$74.48 | 7. \$53.33 | 8. \$62.50 |
| 9. \$114.27 | | | |

Reteaching 6-7

- | | |
|---------------------------|-----------------------|
| 1. \$125 to \$150 | 2. 2,093 to 2,184 mil |
| 3. \$105,000 to \$120,000 | 4. 15 to 18.75 points |

Reteaching 6-8

- | | | |
|----------------|---------------|---------------|
| 1. \$15 | 2. \$30 | 3. \$80 |
| 4. \$180 | 5. \$162 | 6. \$313.50 |
| 7. \$899.89 | 8. \$1,458.61 | 9. \$2,142.45 |
| 10. \$5,668.70 | 11. \$240 | |

Reteaching 6-9

- | | | | | |
|-------------------|-------------------|------------------|-------------------|--------------------|
| 1. $\frac{1}{12}$ | 2. $\frac{1}{4}$ | 3. $\frac{1}{6}$ | 4. $\frac{1}{2}$ | 5. $\frac{1}{2}$ |
| 6. $\frac{1}{3}$ | 7. $\frac{2}{3}$ | 8. 1 | 9. $\frac{1}{10}$ | 10. $\frac{3}{20}$ |
| 11. $\frac{1}{5}$ | 12. $\frac{1}{4}$ | | | |

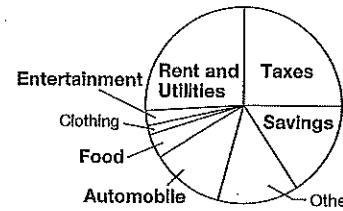
Enrichment 6-1

1. Expense	Fraction	Decimal	Percent	Amount
Rent and Utilities	$\frac{13}{50}$	0.26	26%	7,800
Food	$\frac{1}{25}$	0.04	4%	1,200
Entertainment	$\frac{1}{40}$	0.025	2.5%	750
Clothing	$\frac{3}{200}$	0.015	1.5%	450
Taxes	$\frac{1}{4}$	0.25	25%	7,500
Automobile	$\frac{3}{25}$	0.12	12%	3,600
Other	$\frac{2}{15}$	0.13	$13\frac{1}{3}\%$	4,000

2. \$4,700 3. $15\frac{2}{3}\%$ 4. 4%

5. Sample answer: Rent and Utilities (26%), Entertainment (2.5%), Automobile (12%)

6.



Enrichment 6-2

- | | | | |
|----------------------|----------------------|----------|----------|
| 1. 25% | 2. $33\frac{1}{3}\%$ | 3. 12.5% | 4. 12.5% |
| 5. $43\frac{3}{4}\%$ | 6. $83\frac{1}{3}\%$ | 7. 60% | 8. 55% |
| 9. 50% | 10. 25% | | |

Enrichment 6-3

- | | | | |
|---|-------------|------------|-------|
| 1. 28% | 2. \$28,000 | 3. \$1,750 | 4. 5% |
| 5. \$2,000 | 6. \$750 | | |
| 7. Sample answer: By the percent method since it would result in a higher bonus. | | | |
| 8. \$35,000 | | | |
| 9. Sample answer: By the straight dollar amount, since it recognizes everyone's contribution equally. | | | |

Enrichment 6-4

- | | |
|--|-----------|
| 1. \$8.50 | 2. 15; 85 |
| 3. $.85 \times 8.50 = 2$ | 4. \$7.2 |
| 5. about \$1.50; $10.5 \times 0.15 = n$; 10 th grade students would save \$1.58 during the summer. | |
| 6. $\$46.75; .85(4 \times 8.50) + 8.50(2 \times 10.50) = C$ | |

Chapter 6 Answers

Practice 6-1

1. 95%
2. 6%
3. 0.4%
4. 27%
5. 63%
6. 0.5%
7. 140%
8. 257%
9. 80%
10. 70%
11. 83.3%
12. 450%
13. 62.5%
14. 6.7%
15. 36%
16. 187.5%
17. 16.7%
18. 91.7%
19. 5%
20. 345%
21. 0.7
22. 0.10
23. 8.0
24. 0.37
25. 0.026
26. 2.34
27. 0.09
28. 0.035
29. $\frac{1}{10}$
30. $\frac{47}{100}$
31. $\frac{11}{200}$
32. $4\frac{73}{100}$
33. $\frac{3}{20}$
34. $\frac{23}{25}$
35. $\frac{13}{400}$
36. $5\frac{12}{25}$
37. $\frac{17}{20}$
38. $\frac{21}{50}$
39. $\frac{7}{10}$
40. $1\frac{1}{2}$
41. 83.3%
42. 2%
43. 96.5%
44. 10%

Practice 6-2

1. 7
2. 9
3. 108
4. 4
5. 6
6. 200
7. 200
8. 140
9. 250
10. 450
11. 595
12. 180
13. 76
14. 128
15. 110
16. 360
17. 630
18. 324
19. 80
20. 2.4
21. 800
22. 2.5
23. 300
24. 250
25. 38 species
26. 1,840,000 people
27. 127 students
28. 700 students

Practice 6-3

1. $\frac{21}{50} = \frac{n}{100}$; 42%
2. $\frac{n}{72} = \frac{45}{100}$; 32.4
3. $\frac{83}{n} = \frac{70}{100}$; 118.6
4. $\frac{45}{65} = \frac{n}{100}$; 69.2%
5. 45.24
6. 716.67
7. 138.46%
8. 235.29
9. 183.87
10. 149.29
11. 48.76
12. 224
13. 364.29%
14. 42.86%
15. 145
16. 65.1
17. 160%
18. 250%
19. 108.33
20. 84
21. 300%
22. 12.5%
23. 136
24. 93.24
25. 53.75%
26. 355,586 people
27. 4%

Practice 6-4

1. 31.3%
2. 172
3. 119
4. 58.3%
5. 46.7%
6. 184%
7. 146.4
8. 139.5
9. 400
10. 1.7%
11. 31.6%
12. 303.3
13. 244.4
14. 250%
15. 56.1%
16. 258.8%
17. 65.8
18. 13,316.4
19. 266.7
20. 1.6%
21. 17.8%
22. 1,423.5
23. 225%
24. 5%
25. 91.1
26. 41.7
27. 400 people
28. 775 students
29. 6%
30. \$1,600
31. \$2,650,000
32. \$720
33. 4.7%
34. \$64,421.50

Practice 6-5

1. 33.3% increase
2. 44.4% decrease
3. 25% decrease
4. 39.5% increase
5. 100% increase
6. 25% decrease
7. 40.7% increase
8. 75% decrease
9. 25% increase
10. 100% increase
11. 77% decrease
12. 71.6% decrease
13. 111.5% increase
14. 39.9% increase
15. 72.9% decrease
16. 30.4% decrease
17. 33.8% increase
18. 76.4% decrease
19. 143.6% increase
20. 90.1% increase
21. 47.4% decrease
22. 53.6% increase
23. 173.1% increase
24. 13.1% increase
25. 61.6%
26. 11.5%
27. 6.7%
28. 5.2%
29. 6.3%
30. 59.4%

Practice 6-6

1. \$16.00
2. \$18.75
3. \$27.95
4. \$42.00
5. \$43.96
6. \$68.21
7. \$124.77
8. \$158.22
9. \$203.31
10. \$187.20
11. \$249.10
12. \$3,900.00
13. \$9.00
14. \$10.20
15. \$15.16
16. \$17.81
17. \$25.98
18. \$29.99
19. \$29.81
20. \$35.07
21. \$41.50
22. \$48.17
23. \$75.29
24. \$1,700.00
25. \$45.83
26. \$17.59
27. \$61.53
28. \$11.40
29. \$76
30. \$58.63

Practice 6-7

1. 3.2 miles
2. 180 adult tickets
3. \$310
4. 228
5. 75, 76, 77
6. 10 dimes
7. 12 ways
8. more; by \$1.50

Practice 6-8

1. \$1,004.00
2. \$1,009.98
3. \$287.50
4. \$972.00
5. \$1,375.00
6. \$1,426.46
7. \$1,754.79
8. \$1,925.00
9. \$2,360.00
10. \$2,382.03
11. \$2,977.54
12. \$4,764.06
13. \$7,500.00
14. \$7,800.00
15. \$8,144.47
16. \$8,864.73
17. \$1,603.57
18. \$503.57
19. 5% for 10 years; \$18.38
20. Both earn \$500.

Practice 6-9

1. $\frac{1}{3}$
2. $\frac{5}{12}$
3. $\frac{1}{4}$
4. $\frac{3}{4}$
5. $\frac{2}{3}$
6. 1
7. $\frac{2}{9}$
8. $\frac{4}{15}$
9. $\frac{1}{3}$
10. $\frac{8}{45}$
11. $\frac{2}{3}$
12. $\frac{7}{9}$
- 13a. $\frac{1}{1,200}$
- 13b. $\frac{1}{400}$
14. 0.55; 90 slices

15a.

H	H	T
H	H, H	H, T
T	T, H	T, T

15b. $\frac{1}{2}$