

REVIEW KEY VOCABULARY

- opposite, p. 4
- reciprocal, p. 4
- numerical expression, p. 10
- power, p. 10
- exponent, p. 10
- base, p. 10
- variable, p. 11
- algebraic expression, p. 11
- term, p. 12
- variable term, p. 12
- constant term, p. 12
- coefficient, p. 12
- like terms, p. 12
- equivalent expressions, p. 12
- identity, p. 12
- equation, p. 18
- linear equation, p. 18
- solution of an equation, p. 18
- equivalent equations, p. 18
- formula, p. 26
- solve for a variable, p. 26
- verbal model, p. 34
- linear inequality, p. 41
- solution of an inequality, p. 41
- graph of an inequality, p. 41
- compound inequality, p. 41
- equivalent inequalities, p. 42
- absolute value, p. 51
- extraneous solution, p. 52

6. Sample answer: The methods for using the properties of addition are the same for both methods. The procedures are different when multiplying or dividing an inequality by a negative number, the inequality symbol changes, but this process has no effect on an equation.

VOCABULARY EXERCISES

- Copy and complete: In a power, the ? represents the number of times the ? is used as a factor. **exponent, base**
- Copy and complete: If substituting a number for a variable in an equation results in a true statement, then the number is a(n) ? of the equation. **solution**
- Copy and complete: A(n) ? is an apparent solution that must be rejected because it does not satisfy the original equation. **extraneous solution**
- Identify the like terms in the expression $40 + 3x^3 + 3x^2 - 7 - x^2$. **$3x^2$ and $-x^2$, 40 and -7**
- Give an example of two equivalent algebraic expressions.
Sample answer: $3(x - 4)$ and $3x - 12$
- WRITING** Compare the procedures for solving a linear equation and a linear inequality. How are they similar? How are they different?

REVIEW EXAMPLES AND EXERCISES

Use the review examples and exercises below to check your understanding of the concepts you have learned in each lesson of Chapter 1.

1.1 Apply Properties of Real Numbers

pp. 2–9

EXAMPLE

Identify the property that the statement illustrates.

a. $2(w + \ell) = 2w + 2\ell$

Distributive property

b. $6 + (2 + 4) = 6 + (4 + 2)$

Commutative property of addition

EXERCISES

Identify the property that the statement illustrates.

7. $17 \cdot \frac{1}{17} = 1$

8. $60 + 0 = 60$

9. $3a + 7a = (3 + 7)a$

7. Inverse property of multiplication

8. Identity property of addition

9. Distributive property

EXAMPLE 3

on p. 4
for Exs. 7–9

Extra Example 1.1

Identify the property that the statement illustrates.

a. $(8 \cdot 9) \cdot 2 = (9 \cdot 8) \cdot 2$

Commutative property of multiplication

b. $16 + (-16) = 0$ **Inverse property of addition**

Extra Example 1.2

Simplify the expression
 $-3(5 - x) + 6(2x + 4)$. **$15x + 9$**

Extra Example 1.3

Solve $8(3x - 4) = -5(6 - 3x)$. **$\frac{2}{9}$**

EXAMPLES 3 and 4

on pp. 11–12
 for Exs. 10–16

EXAMPLES 1, 2, 3, and 4
 on pp. 18–20
 for Exs. 17–24

1.2 Evaluate and Simplify Algebraic Expressions

pp. 10–16

EXAMPLE

Simplify the expression.

$$\begin{aligned} 5(y - 4) - 3(2y - 9) &= 5y - 20 - 6y + 27 && \text{Distributive property} \\ &= (5y - 6y) + (-20 + 27) && \text{Group like terms.} \\ &= -y + 7 && \text{Combine like terms.} \end{aligned}$$

EXERCISES

Simplify the expression.

10. $25x + 14 - 17 - 6x$ **$19x - 3$** 11. $6y + 12x - 12y - 9x$ **$3x - 6y$**
 12. $6(n - 2) - 8n + 40$ **$-2n + 28$** 13. $5(2b + 3) + 8(b - 6)$ **$18b - 33$**
 14. $3g + 9g^2 - 12g^2 + g$ **$-3g^2 + 4g$** 15. $7t^4 + 7t^2 - 2t^2 - 9t^4$ **$-2t^4 + 5t^2$**

16. **TAXI RATES** A New York City taxi charges \$2.50, plus \$.40 for each fifth of a mile if it is not delayed by traffic. Write an expression for the cost of the ride if you travel x miles in the taxi with no traffic delays. **$2x + 2.5$**

1.3 Solve Linear Equations

pp. 18–24

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

$$\begin{aligned} -4(3x + 5) &= -2(5 - x) && \text{Write original equation.} \\ -12x - 20 &= -10 + 2x && \text{Distributive property} \\ -20 &= -10 + 14x && \text{Add } 12x \text{ to each side.} \\ -10 &= 14x && \text{Add } 10 \text{ to each side.} \\ -\frac{5}{7} &= x && \text{Divide each side by } 14 \text{ and simplify.} \end{aligned}$$

EXERCISES

Solve the equation. Check your solution.

17. $24x + 16 = 12$ **$-\frac{1}{6}$** 18. $-6y + 15 = -9$ **4**
 19. $4(q - 5) = 16$ **9** 20. $7m + 38 = -5m - 16$ **-4.5**
 21. $48j + 25 = 12j - 11$ **-1** 22. $8(2n - 5) = 3(6n - 2)$ **-17**

23. **SALES TAX** You buy a jacket, and the sales tax is 6%. The total cost is \$79.49. Find the cost of the jacket before the tax. **\$74.99**

24. **FOOD SHOPPING** At a vegetable stand, you bought 3 pounds of peppers for \$4.50. Green peppers cost \$1 per pound and orange peppers cost \$4 per pound. Find how many pounds of each kind of pepper you bought.
2.5 lb green peppers, 0.5 lb orange peppers

1.4 Rewrite Formulas and Equations

pp. 26–32

25. $y = -10x + 7$; -23

26. $y = \frac{3}{8}x + \frac{9}{4}$; 3

27. $y = \frac{-15}{x-6}$; 15

28. $y = \frac{2}{3}x - \frac{3}{2}$; $4\frac{1}{2}$

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

30. $y = \frac{x-1}{3x}$; $\frac{2}{5}$

EXAMPLE

Solve $5x - 11y = 7$ for y . Then find the value of y when $x = 4$.

$$\begin{aligned} \text{STEP 1} \quad 5x - 11y &= 7 && \text{Write original equation.} \\ -11y &= 7 - 5x && \text{Subtract } 5x \text{ from each side.} \\ y &= -\frac{7}{11} + \frac{5}{11}x && \text{Divide each side by } -11. \end{aligned}$$

$$\begin{aligned} \text{STEP 2} \quad y &= -\frac{7}{11} + \frac{5}{11}(4) && \text{Substitute } 4 \text{ for } x. \\ y &= \frac{13}{11} && \text{Simplify.} \end{aligned}$$

EXERCISES

Solve the equation for y . Then find the value of y for the given value of x . **25–30. See margin.**

25. $10x + y = 7$; $x = 3$ 26. $8y - 3x = 18$; $x = 2$ 27. $xy - 6y = -15$; $x = 5$
28. $4x = 6y + 9$; $x = 9$ 29. $5x - 2y = 10$; $x = -6$ 30. $x - 3xy = 1$; $x = -5$

31. **GEOMETRY** The formula $S = 2\pi rh + 2\pi r^2$ gives the surface area S of a cylinder with height h and radius r . Solve the formula for h . Find h if $r = 5$ centimeters and $S = 400$ square centimeters. $h = \frac{S - 2\pi r^2}{2\pi r}$; about 7.73 cm

EXAMPLES 2, 3, and 4 on pp. 27–28 for Exs. 25–31

1.5 Use Problem Solving Strategies and Models

pp. 34–40

EXAMPLE

Find the time it takes to drive 525 miles at 50 miles per hour.

$$\begin{array}{ccccc} \text{Distance} & = & \text{Rate} & \cdot & \text{Time} \\ \text{(miles)} & & \text{(miles/hour)} & & \text{(hours)} \\ \downarrow & & \downarrow & & \downarrow \\ 525 & = & 50 & \cdot & t \end{array}$$

$525 = 50t$ **Write equation.**

$10.5 = t$ **Divide each side by 50.**

► It takes 10.5 hours to drive 525 miles at 50 miles per hour.

EXERCISES

32. **AVERAGE SPEED** It takes 3 hours for a train to travel 175 miles. What is the average speed of the train? $58\frac{1}{3}$ mi/h
33. **CAR RENTAL** While on vacation, your family rented a car for \$293. The car rental cost \$180, plus \$.25 for every mile driven over 150 miles. How many miles did you drive while on vacation? **602 mi**

EXAMPLES 1 and 4 on pp. 34–36 for Exs. 32–33

Extra Example 1.4

Solve $4x - 3y = 9$ for y . Then find the value of y when $x = 15$.

$y = -3 + \frac{4}{3}x$ or $y = \frac{4}{3}x - 3$; **17**

Extra Example 1.5

If you drive 264 miles in 5.5 hours, what is your average speed?

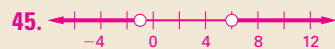
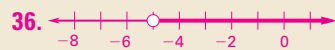
48 mi/h

Extra Example 1.6

Solve $18 + 2x > 5x + 6$. Then graph the solution. $x < 4$

**Extra Example 1.7**

Solve $|4x - 2| \leq 10$. Then graph the solution. $-2 \leq x \leq 3$



EXAMPLES
1, 2, 3, and 4
on pp. 41–43
for Exs. 34–40

EXAMPLES
2, 3, 4, and 5
on pp. 52–54
for Exs. 41–47

1.6 Solve Linear Inequalities

pp. 41–47

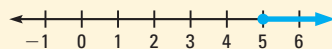
EXAMPLE

Solve $25 - 3x \leq 10$. Then graph the solution.

$$25 - 3x \leq 10$$

$$-3x \leq -15$$

$$x \geq 5$$



Write original inequality.

Subtract 25 from each side.

Divide each side by -3 and reverse the inequality.

Graph the solution.

EXERCISES

Solve the inequality. Then graph the solution. 34–39. See margin for art.

34. $2x - 3 < -1$ $x < 1$

35. $7 - 3x \geq -11$ $x \leq 6$

36. $15x + 8 > 9x - 22$
 $x > -5$

37. $13x + 24 \leq 16 - 3x$ $x \leq -\frac{1}{2}$

38. $-5 < 10 - x < 5$ $5 < x < 15$

39. $-8 \leq 3x + 1 \leq 10$
 $-3 \leq x \leq 3$

40. **GEOMETRY** A triangle has sides of lengths 10, $2x$, and $3x$. The sum of the lengths of any two sides is greater than the length of the third side. Write and solve three inequalities to find the possible values of x .

$10 + 2x > 3x$, $5x > 10$, $10 + 3x > 2x$; $x < 10$, $x > 2$, $x > -10$; $2 < x < 10$

1.7 Solve Absolute Value Equations and Inequalities

pp. 51–58

EXAMPLE

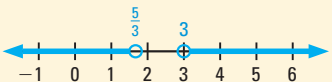
Solve $|3x - 7| > 2$. Then graph the solution.

$$|3x - 7| > 2$$

$$3x - 7 < -2 \quad \text{or} \quad 3x - 7 > 2$$

$$3x < 5 \quad \text{or} \quad 3x > 9$$

$$x < \frac{5}{3} \quad \text{or} \quad x > 3$$



Write original inequality.

Write equivalent compound inequality.

Add 7 to each side.

Divide each side by 3.

Graph the solution.

EXERCISES

Solve the equation. Check for extraneous solutions.

41. $|3p + 2| = 7$ $-3, 1\frac{2}{3}$

42. $|9q - 5| = 2q$ $\frac{5}{7}, \frac{5}{11}$

43. $|8r + 1| = 3r$ no solution

Solve the inequality. Then graph the solution. 44–46. See margin for art.

44. $|x - 5| \geq 1$ $x \leq 4$ or $x \geq 6$

45. $|5 - 2y| > 7$ $y < -1$ or $y > 6$

46. $|6z + 5| \leq 25$ $-5 \leq z \leq 3\frac{1}{3}$

47. **VOLLEYBALL** The circumference of a volleyball should be 26 inches, with a tolerance of 0.5 inch. Write and solve an absolute value inequality that describes the acceptable circumferences of a volleyball. $|v - 26| \leq 0.5$, $25.5 \text{ in.} \leq v \leq 26.5 \text{ in.}$