Chapter 1 Chapter Summary and Review

VOCABULARY

- **variable,** *p. 3*
- **variable expression,** *p. 3*
- **value,** *p. 3*
- **numerical expression,** *p. 3*
- **evaluate,** *p. 4*
- **power,** *p. 9*
- **exponent,** *p. 9*
- **base,** *p. 9*
- **grouping symbols,** *p. 10*
- **order of operations,** *p. 15*
- **left-to-right rule,** *p. 16*
- **equation,** *p. 24*
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- **function,** *p. 48*
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- **range,** *p. 49*

1.1 VARIABLES IN ALGEBRA

Examples on pp. 3–5

EXAMPLES Evaluate the variable expression when $y = 4$.

a. $10 - y = 10 - 4$
$= 6$

b. $11y = 11(4)$
$= 44$

c. $\frac{16}{y} = \frac{16}{4}$
$= 4$

d. $y + 9 = 4 + 9$
$= 13$

Evaluate the expression for the given value of the variable.

1. $a + 14$ when $a = 6$

2. $18x$ when $x = 2$

3. $\frac{m}{3}$ when $m = 18$

4. $\frac{15}{y}$ when $y = 3$

5. $p - 12$ when $p = 22$

6. $5b$ when $b = 6$

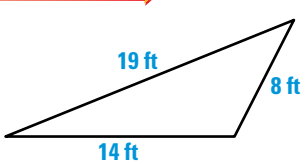
7. You are walking at a rate of 3 miles per hour. Find the distance you travel in 2 hours.

8. You hike at a rate of 2 miles per hour. Find the distance you travel in 6 hours.

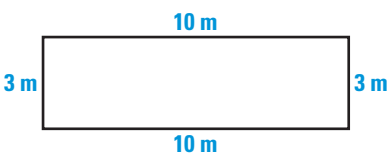
9. A race car driver maintains an average speed of 175 miles per hour. How far has she traveled in 3 hours?

Geometry Link **Find the perimeter of the geometric figure.**

10.



11.



1.2 Exponents and Powers

Examples on pp. 9–11

EXAMPLES Evaluate the variable expression when $b = 3$.

a. $b^2 = 3^2$
$= 3 \cdot 3$
$= 9$

b. $(10 - b)^3 = (10 - 3)^3$
$= 7^3$
$= 7 \cdot 7 \cdot 7$
$= 343$

c. $10(5^b) = 10(5^3)$
$= 10(5 \cdot 5 \cdot 5)$
$= 10(125)$
$= 1250$

Write the expression in exponential form.

12. eight to the fourth power

13. six cubed

14. $5 \cdot 5 \cdot 5 \cdot 5 \cdot 5$

Evaluate the expression for the given value of the variable.

15. x^4 when $x = 2$

16. $(5x)^3$ when $x = 5$

17. $6 + (b^3)$ when $b = 3$

1.3 Order of Operations

Examples on pp. 15–17

EXAMPLE Evaluate $550 - 4(3 + 5)^2$.

$550 - 4(3 + 5)^2 = 550 - 4(8)^2$ Add numbers within grouping symbols.
$= 550 - 4 \cdot 64$ Evaluate the power.
$= 550 - 256$ Multiply.
$= 294$ Subtract.

Evaluate the numerical expression.

18. $9 + (3 - 2) - 3^2$

19. $(14 - 7)^2 + 5$

20. $6 + 2^2 - (7 - 5)$

21. $\dfrac{15 - 6}{6 + 3^2 - 12}$

22. $\dfrac{28 + 4}{4^2}$

23. $\dfrac{3^3 + 7}{4 \cdot 2}$

1.4 Equations and Inequalities

Examples on pp. 24–26

EXAMPLES Check to see if $x = 4$ is a solution of the equation $5x + 3 = 18$ or the inequality $7x - 5 > 20$.

Substitute: $5(4) + 3 \stackrel{?}{=} 18$ **Simplify:** $23 \neq 18$ **Conclusion:** False, 4 is *not* a solution.

Substitute: $7(4) - 5 \stackrel{?}{>} 20$ **Simplify:** $23 > 20$ **Conclusion:** True, 4 is a solution.

Check to see if the given value of the variable is or is not a solution of the equation or the inequality.

24. $2a - 3 = 2;\ a = 4$

25. $x^2 - x = 2;\ x = 2$

26. $9y - 3 > 24;\ y = 3$

27. $5x + 2 \leq 27;\ x = 5$

Use mental math to solve the equation.

28. $w + 7 = 15$

29. $10 - r = 7$

30. $4h = 32$

31. $\frac{c}{4} = 4$

32. $16 + k = 20$

33. $10g = 100$

1.5 Translating Words Into Mathematical Symbols

Examples on pp. 30–32

EXAMPLES Write the phrase or sentence as a variable expression, an equation, or an inequality. Let x represent the number.

A number increased by 10	$x + 10$
The difference of 15 and a number is 8.	$15 - x = 8$
The quotient of a number and 7	$\frac{x}{7}$
The product of 5 and a number is less than or equal to 10.	$5x \leq 10$

Write the phrase or sentence as a variable expression, an equation, or an inequality. Let *x* represent the number.

34. 27 divided by a number is 3.

35. A number plus 30

36. A number times 8 is greater than 5.

37. A number decreased by 9

1.6 A Problem Solving Plan Using Models

Examples on pp. 36–38

EXAMPLE You can model problems like the following: If you can save \$5.00 a week, how many weeks must you save to buy a CD that costs \$15.00?

VERBAL MODEL

Amount saved per week • Number of weeks = Cost of CD

LABELS

Amount saved per week = 5 (dollars per week)

Number of weeks = w (weeks)

Cost of CD = 15 (dollars)

ALGEBRAIC MODEL

$5w = 15$ Write algebraic model.

$w = 3$ Solve with mental math.

ANSWER ▶ You must save for 3 weeks.

38. You are given \$75 to buy juice for the school dance. Each bottle of juice costs \$.75. Write a verbal and an algebraic model to find how many bottles of juice you can buy. Then use mental math to solve the equation.

1.7 Tables and Graphs

Examples on pp. 42–44

EXAMPLE The table shows the number of tennis titles won by United States women. Write an inequality to determine if the number of Wimbledon titles won by United States women is greater than the number of Australian Open titles plus the number of French Open titles.

Event	Number of Titles
Australian Open	14
French Open	25
Wimbledon	43

▶ Source: *USA Today as of July 1999*

Inequality $43 \stackrel{?}{>} 14 + 25$

$43 > 39$

ANSWER ▶ The number of Wimbledon titles won is greater.

39. Make a bar graph of the data showing the percent of the voting-age population that voted. Write an inequality to determine if the percent in 1996 plus the percent in 1992 is less than the percent in 1976 plus the percent in 1984.

Percent of Voting-Age Population That Voted for President, 1976–1996						
Year	1976	1980	1984	1988	1992	1996
Percent	53.5	52.8	53.3	50.3	55.1	48.9

▶ Source: *US Bureau of the Census*

1.8 An Introduction to Functions

Examples on pp. 48–50

EXAMPLE Make an input-output table for the equation

$$C = 5n + 10$$

where $n = 1, 2, 3,$ and 4. Then determine the range of the function from the given input values in the table.

n	C
1	15
2	20
3	25
4	30

ANSWER ▶ The range for the input values in the table is 15, 20, 25, 30.

40. The perimeter P for rectangular picture frames with side lengths of $2w$ and $3w$ is given by the function $P = 4w + 6w$. Make an input-output table that shows the perimeter when $w = 1, 2, 3, 4,$ and 5. Then determine the range of the function from the values in the table.