NAME

Module 4 Solving Problems Using Linear Equations of One Variable
Lesson 3 Solving Geometry Problems Using Equations of One Variable

Write an equation and solve.

1. The perimeter of a square is 200 m. Find the length of each side.

Each side is 50 m long.

2. The perimeter of an equilateral triangle is 72 in. Find the length of each side.

Each side is 24 in. long.

3. The perimeter of an equilateral triangle is 102 ft. Find the length of each side.

Each side is 34 ft long.

4. The perimeter of a rectangle is 54 m. The length is 3 m longer than the width. Find the length of the rectangle.

The rectangle is 15 m long.

5. The perimeter of a rectangle is 46 m. The length is 5 m longer than the width. Find the width of the rectangle.

The rectangle is 9 m wide.

6. The perimeter of an isosceles triangle is 25 cm. The base is 4 cm longer than each leg. Find the length of the base.

The base is 11 cm long.

7. The perimeter of an isosceles triangle is 52 in. Each leg is 8 in. shorter than the base. Find the length of each leg.

Each leg is $\frac{44}{3}$ or $14\frac{2}{3}$ in. long.

8. The perimeter of a scalene triangle is 33 in. The first side is 2 in. shorter than the second side, and the third side is 5 in. longer than the second side. Find the length of the shortest side.

The shortest side is 8 in. long.

9. In an isosceles triangle, the measure of the vertex angle is 5° more than five times the measure of each base angle. Find the measure of the vertex angle.

The vertex angle measures 130°.

10. In a scalene triangle, the measure of the second angle is 10° greater than the measure of the first angle. The third angle measures 20° more than the first angle. Find the measures of the three angles.

The three angles measure 50°, 60°, and 70°.

11. An angle measures 30° more than its complement. Find the measures of the angle and its complement.

The angle and its complement measure 60° and 30°.

12. The measure of an angle is 6° greater than twice the measure of its complement. Find the measure of the angle.

The angle measures 62°.

Journal

1. Suppose a classmate was absent and missed today's lesson. Explain to him or her the three-step problem solving-process.
2. Make a glossary of terms from geometry that are used in this lesson. Write the definition of each word. Where appropriate, make a sketch to clarify your definition.
3. Is the solution to an equation always the solution to a problem? Explain.
4. The formulas $P = 2l + 2w$ and $A = lw$ apply to all rectangles. Explain why these formulas also apply to all squares. Rewrite these formulas so that they could be applied to a square whose side has length s.
5. The formula for the perimeter of a rectangle is $P = 2l + 2w$. Explain how it might be possible to write this formula so that it has only one variable on the right side. Use problem 5 at the beginning of this Independent Practice to help you explain your answer.

Cumulative Review

Simplify.

1. $3^2 - 10$ **–1**
2. $(5 - 8)^3 + 15$ **–12**
3. $8 - (-2)^3 + 4^2$ **32**
4. $\frac{10 - (-2)}{6^2 - 30}$ **2**
5. $\frac{(-4)(8)}{(2)(-2)^3}$ **2**

Identify the property shown in each equation.

6. $3 + (5 + 8) = (5 + 8) + 3$

   Commutative Property of Addition

7. $8 \cdot 1 = 8$

   Identity Property of Multiplication

8. $(ab)5 = a(b \cdot 5)$

   Associative Property of Multiplication

9. $a + 7 + (-7) = a + 0$

   Inverse Property of Addition

10. $0 \cdot r = 0$

    Zero Property of Multiplication

Possible Journal Answers

1. **The three-step problem-solving process is Make a Sketch, Write an Equation, and Solve & Check. The purpose of making a sketch is to get a visual idea of the problem. It usually is not important to be precise in the sketch. Use the sketch, plus the geometric ideas and vocabulary presented in the problem to determine a relationship and write an equation. Solve the equation, then determine how to use the value you found to answer the question. Then check your answer.**
2. **Answers will vary. Students should define the terms equilateral, scalene, isosceles, perimeter, base, vertex, base angle, vertex angle, supplementary, and complementary.**
3. **No. If the solution to the equation is a value of x, then the solution to the problem may be that value of x or it may be in terms of x. For example, the solution to an equation may be given by $x = 6$, where x is the length of a rectangle. If the problem asks for the width of the rectangle, then 6 may not be the solution to the problem.**
4. **The formulas apply to all squares because all squares are rectangles. For a square whose side has length s, $P = 2s + 2s = 4s$ and $A = s \cdot s = s^2$.**
5. **You might be able to represent one of the dimensions (length or width) by a variable and the other dimension in terms of that same variable. For example, in problem 5 at the beginning of this Independent Practice, the width can be x and the length $x + 5$. Then the formula is $P = 2(x + 5) + 2x$.**