

## LESSON 2.8

### Notes

#### GOAL

Write equations in function form and rewrite formulas

#### Vocabulary

An equation in  $x$  and  $y$  is written in **function form** when the dependent variable  $y$  is isolated on one side of the equation.

A **literal equation** is an equation that contains two or more variables.

#### EXAMPLE 1

**Rewrite an equation in function form**

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Write  $9x - 4y = 8$  in function form

#### Solution

To write an equation in function form, **MEANS** solve the equation for  $y$

$$9x - 4y = 8 \quad \text{Write original equation.}$$

$$-4y = 8 - 9x \quad \text{Subtract } 9x \text{ from each side.}$$

$$y = -2 + \frac{9}{4}x \quad \begin{array}{l} \text{Divide each side by } -4. \\ \text{Simplify} \end{array}$$

The equation  $y = \frac{9}{4}x - 2$  is written in function form.

**EXAMPLE 2**  
**Solve a literal equation**

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The formula for the volume of a rectangular prism is  $V = lwh$ . Solve the formula for  $l$ .

**Solution**

$$V = lwh \quad \text{Write original equation.}$$

$$\frac{v}{wh} = \frac{lwh}{wh} \quad \text{Assume } w \neq 0 \text{ and } h \neq 0. \text{ Divide each side by } wh.$$

$$\frac{v}{wh} = l \quad \text{Simplify.}$$

The rewritten equation is  $\frac{v}{wh} = l$ .

**Exercises for Examples 1 and 2**

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**Write the equation in function form**

1.  $7x + y = 12$
2.  $3y - 9x = 21$
3.  $5y - 2x = 15$

**Solve the literal equation**

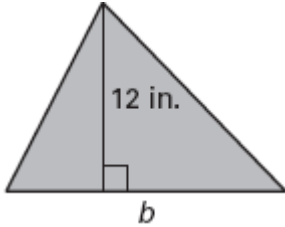
4.  $I = Prt$  for  $P$
5.  $A = \frac{1}{2} (b_1 + b_2)h$  for  $b_2$

### EXAMPLE 3

#### Solve and use a geometric formula

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The area  $A$  of a triangle is given by the formula  $A = \frac{1}{2}bh$  where  $b$  is the base and  $h$  is the height



- Solve the formula for the base  $b$ .
- Use the rewritten formula to find the base of the triangle shown, which has an area of 106.8 square inches.

#### **Solution**

- Solve** the formula for  $b$ .

$$A = \frac{1}{2}bh \quad \text{Write original formula.}$$

$$2A = bh \quad \text{Multiply each side by 2}$$

$$\frac{2A}{h} = b \quad \text{Divide each side by } h.$$

**Substitute** 106.8 for  $A$  and 12 for  $h$  in the rewritten formula.

$$b = \frac{2A}{h} \quad \text{Write rewritten formula.}$$

$$b = \frac{2(106.8)}{12} \quad \text{Substitute 106.8 for } A \text{ and 12 for } h$$

$$b = 17.8 \quad \text{Simplify.}$$

The base of the triangle is 17.8 inches.

### **Exercises for Example 3** .....

**The surface area  $S$  of a sphere is given by the formula  $S = 4\pi r^2$  where  $r$  is the radius of the sphere**

6. Solve the formula for  $r$ .
7. Use the rewritten formula from Exercise 6 to find  $r$  when  $S = 314$  square meters. Use 3.14 for  $\pi$ .

## *Answer Key*

### *Lesson 2.8*

#### **Study Guide**

1.  $y = -7x + 12$

2.  $y = 3x + 7$

3.  $y = \frac{2}{5}x + 3$

4.  $\frac{I}{rt} = P$

5.  $\frac{2A}{h} - b_1 = b_2$

6.  $r = \sqrt{\frac{S}{4\pi}}$

7. 5 m