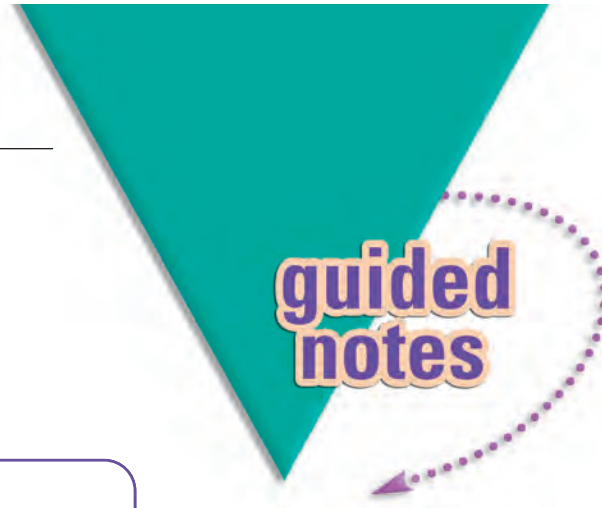**NAME**

Module 3   Solving Linear Equations of
           One Variable
Lesson 6   Rewriting Formulas

*guided
notes*

Lesson Objectives

- Use formulas to find the value of one of the variables in the formula.
- Solve formulas for a given variable in the formula.
- Use formulas to solve real-world applications.

A formula is an **equation** that states a **rule** about related quantities. The related quantities are represented by the **variables**.

We use a formula to find the value of one of the **variables** in the formula. Finding the value of a variable in a formula sometimes requires you to evaluate an **algebraic expression**. If length = 3 ft and width = 2 ft, then $A = lw = (3)(2) =$ **6** square feet.

Sometimes we need to solve an **equation**. To find the width of a rectangle whose length is 6 feet and whose area is 12 square feet, substitute **12** for A and **6** for l in the formula $A = lw$. Then solve the equation

$A = lw$

$\underline{\text{12}} = \underline{\text{6}}\,w$

$\underline{\text{2}} = \underline{w}$

The width of the rectangle is **2 feet**.

monotype composition
410-467-3300

To solve the formula $A = lw$ for width, use the rules of algebra. Undo the multiplication by dividing both sides of the equation by l.

$A = lw$

$$\dfrac{A}{l} \rule{2cm}{0.4pt} = \dfrac{lw}{l} \rule{2cm}{0.4pt} w$$

$$\dfrac{A}{l} \rule{2cm}{0.4pt} = w \rule{2cm}{0.4pt}$$

For a rectangle, width $= \dfrac{\text{area}}{\text{length}}$.

1 ▸ Find the width of a rectangle that has an area of 24 square inches and a length of 8 inches.

$$w = \dfrac{A}{l}$$

$$w = \dfrac{24}{8} \rule{2cm}{0.4pt}$$

$$w = 3 \rule{2cm}{0.4pt}$$

The width of the rectangle is **3 inches** _____.

Another formula that can be rewritten and then used to find the width of a rectangle is $P =$ **2l + 2w** _____. To rewrite this formula, get **w** _____ by itself on one side of the equation.

$P = 2l + 2w$

P − 2l _____ $=$ **2w** _____ First, subtract $2l$ from both sides of the equation.

$\dfrac{\textbf{P − 2l}}{\textbf{2}}$ _____ $=$ **w** _____ Then, divide both sides of the equation by 2.

For a rectangle, width $= \dfrac{\textbf{perimeter − 2(length)}}{\textbf{2}}$ _____.

Module 3 Lesson 6

Guided Notes

monotype composition
410-467-3300

2 ▶ Find the width of a rectangle that has a perimeter of 12 feet and a length

of 4 feet.

$w = \dfrac{P - 2l}{2}$

$w = \dfrac{\textbf{12 − 2 · 4}}{\textbf{2}}$

$w = \dfrac{\frac{\textbf{12 − 8}}{\textbf{2}}}{}$

$w = \dfrac{\frac{\textbf{4}}{\textbf{2}}}{}$

$w = \underline{\quad \textbf{2} \quad}$

The width of the rectangle is __**2 feet**__.

Temperature is measured in the United States by degrees Fahrenheit and in

Canada by degrees __**Celsius**__.

The formula for converting Celsius to Fahrenheit is $F = \underline{\quad \mathbf{\frac{9}{5}C + 32} \quad}$.

Convert 30°C to Fahrenheit:

$F = \frac{9}{5}C + 32$

$F = \frac{9}{5}(\underline{\ \textbf{30}\ }) + 32$

$F = \underline{\ \textbf{54}\ } + 32$

$F = \underline{\ \textbf{86}\ }$

$30°C = \underline{\ \textbf{86°F}\ }$

Solve the formula $F = \frac{9}{5}C + 32$ for C.

$F = \frac{9}{5}C + 32$

$\dfrac{\textbf{F − 32}}{} = \dfrac{\mathbf{\frac{9}{5}C}}{}$ Subtract 32 from both sides.

$\dfrac{\mathbf{\frac{5}{9}(F − 32)}}{} = \dfrac{\mathbf{\frac{5}{9} \cdot \frac{9}{5}C}}{}$ Multiply each side of the equation by $\frac{5}{9}$,

$\frac{5}{9}(F − 32) = C$ which is the reciprocal of $\frac{9}{5}$.

3 ▶ Solve $d = rt$ for r.

$$d = rt$$

$$\frac{d}{t} = \frac{rt}{t}$$

$$\frac{d}{t} \underline{\hspace{1.5cm}} = r$$

4 ▶ Solve $V = \frac{1}{3}\pi r^2 h$ for h.

$$V = \frac{1}{3}\pi r^2 h$$

$$\underline{3V\hspace{1cm}} = 3 \cdot \frac{1}{3}\pi r^2 h$$

$$3V = \underline{\pi r^2 h\hspace{1cm}}$$

$$\frac{3V}{\pi r^2} = \frac{\dfrac{\pi r^2 h}{\pi r^2}}{}$$

$$\underline{\frac{3V}{\pi r^2}\hspace{1cm}} = h$$