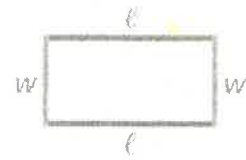


3<sup>rd</sup>

# Topic 1.4 – Literal Equations and Formulas

## Model & Discuss

Nora drew a nonsquare rectangle. Then she drew the length of each side from end to end to make a line segment to represent the perimeter.



WARM-UP

A. Write an equation that represents the perimeter of the model shown.

B. Drag to rearrange the order of the sides so you can represent the perimeter with a different equation. Is this equation equivalent to your first equation?

C. How many different ways can you express the relationship in parts A and B? Are any of them more useful than others?

### EXAMPLE 1 Rewrite Literal Equations

Janet wants to calculate the time it takes to earn a certain amount of interest on a principal amount in an investment with simple interest. What equation can she use?

Simple Interest  $I = prt$

$I$  → interest  
 $p$  → principal  
 $r$  → rate  
 $t$  → time

$$\frac{I}{pr} = \frac{prt}{pr} \Rightarrow t = \frac{I}{pr}$$

Try... Solve for P  $p = \frac{I}{rt}$

### EXAMPLE 2 Use Literal Equations to Solve Problems

In a half hour, Sarah is meeting her friends at the lake, 6 mi from her house. At what average speed must she ride her bike to get there on time?

$$d = rt$$

$d$  → distance  
 $r$  → rate  
 $t$  → time

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

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

$$r = \frac{6}{0.5}$$

$$= 12$$

So, Sarah needs to ride 12mph to get there on time

Try... Sarah has 15 minutes to get to work that is 2.5 miles away. How fast must she bike?

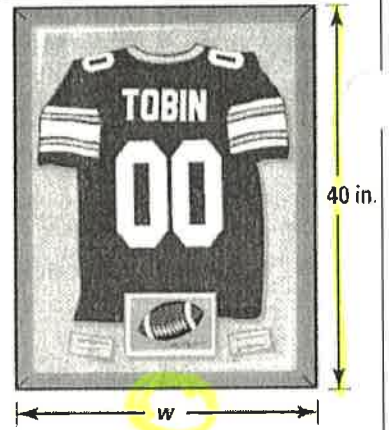
$$r = \frac{2.5}{0.25} = 10$$

10mph

Algebra 1 Guided Notes Topic 1

**EXAMPLE 3** Rewrite a Formula

A worker at a framing store is making a rectangular frame. He knows that the perimeter of the frame is 144 in. and the length is 40 in. How can he determine the width of the frame?



$$P = 2w + 2l$$

$$-2l \quad -2l$$

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

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

$$W = \frac{144 - 2(40)}{2}$$

$$= \frac{144 - 80}{2}$$

$$= \frac{64}{2}$$

$$= 32$$

The width is 32 inches

**EXAMPLE 4** Apply Formulas

According to Teo's bread recipe, he should bake the bread at 190°C for 30 minutes. His oven measures temperature in °F. To what temperature in °F should he set his oven?

$$C = \frac{5}{9}(F - 32)$$



$$\frac{9}{5} \cdot C = \frac{5}{9}(F - 32) \cdot \frac{9}{5}$$

a) Solve for F =

$$\begin{array}{r} \frac{9}{5}C = F - 32 \\ +32 \qquad +32 \end{array}$$

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

b)  $\frac{9}{5}(190) + 32 = F$

$$\begin{array}{r} 342 + 32 = \\ 374 \end{array}$$

to get rid of the fraction we multiplied by the reciprocal

$$\frac{5}{9} \rightarrow \frac{9}{5}$$

Teo should set his oven to 374°F