Name _____   Date _____

LESSON 2.7

Study Guide

For use with the lesson "Solve Proportions Using Cross Products"

GOAL **Solve proportions using cross products.**

Vocabulary

In a proportion, a **cross product** is the product of the numerator of one ratio and the denominator of the other ratio.

Cross Products Property

The cross products of a proportion are equal.

If $\frac{a}{b} = \frac{c}{d}$ where $b \neq 0$ and $d \neq 0$, then $ad = bc$.

A **scale drawing** is a two-dimensional drawing of an object in which the dimensions of the drawing are in proportion to the dimensions of the object.

A **scale model** is a three-dimensional model of an object in which the dimensions of the model are in proportion to the dimensions of the object.

The **scale** of a scale drawing or scale model relates the drawing's or model's dimensions and the actual dimensions.

EXAMPLE 1 ## Solve a proportion using the cross products property

Solve $\frac{20}{35} = \frac{8}{x}$.

Solution

$\frac{20}{35} = \frac{8}{x}$ Write original proportion.

$20 \cdot x = 8 \cdot 35$ Cross products property

$20x = 280$ Simplify.

$x = 14$ Divide each side by 20.

The solution is 14. Check your solution by substituting 14 for x in the original proportion.

Exercises for Example 1

Solve the proportion. Check your solution.

1. $\frac{15}{x} = \frac{126}{210}$

2. $\frac{y + 8}{21} = \frac{y}{9}$

3. $\frac{28}{z} = \frac{24}{z - 5}$

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Study Guide *continued*
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EXAMPLE 2 **Write and solve a proportion**

A bag of large breed dog food recommends feeding a dog 3 cups of food a day for every 40 pounds of body weight. A dog weights 98 pounds. How much food should the dog be eating each day?

Solution

STEP 1 **Write** a proportion involving two ratios that compare the amount of dog food to the weight of the dog.

$$\frac{3}{40} = \frac{x}{98}$$ $\leftarrow$ cups of food
$\leftarrow$ weight of dog

STEP 2 **Solve** the proportion.

$\dfrac{3}{40} = \dfrac{x}{98}$	Write proportion.
$3 \cdot 98 = 40 \cdot x$	Cross products property
$294 = 40x$	Simplify.
$7.35 = x$	Divide each side by 40.

A 98-pound dog should eat 7.35 cups of food each day.

EXAMPLE 3 **Use the scale on a blueprint**

A blueprint of an office building has a scale of 2 inches:15 feet. A completed scale model of the building is about 14.5 inches tall. Estimate the actual height of the office building.

Solution

STEP 1 **Write** a proportion to find the height x of the office building.

$$\frac{2}{15} = \frac{14.5}{x}$$ $\leftarrow$ inches
$\leftarrow$ feet

STEP 2 **Solve** the proportion.

$\dfrac{2}{15} = \dfrac{14.5}{x}$	Write proportion.
$2 \cdot x = 14.5 \cdot 15$	Cross products property
$2x = 217.5$	Simplify.
$x = 108.75$	Divide each side by 2.

The height of the office building is about 108.75 feet.

Exercises for Examples 2 and 3

4. A car travels 135 miles on 4 gallons of gasoline. How many gallons of gasoline will be used to travel 540 miles?

A blueprint has a scale of 3 cm:5 m. Use the given measurement to find the actual distance.

5. 4.5 cm   **6.** 8.1 cm   **7.** 0.6 cm