Name _____ Date _____

LESSON 6.2

Study Guide

For use with pages 364–370

GOAL **Use proportions to solve geometry problems.**

Vocabulary

A **scale drawing** is a drawing that is the same shape as the object it represents. The **scale** is a ratio that describes how the dimensions in the drawing are related to the actual dimensions of the object.

Additional Properties of Proportions

2. Reciprocal Property: If $\frac{a}{b} = \frac{c}{d}$, then $\frac{b}{a} = \frac{d}{c}$.

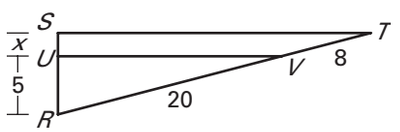
3. If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a}{c} = \frac{b}{d}$.

4. If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a + b}{b} = \frac{c + d}{d}$.

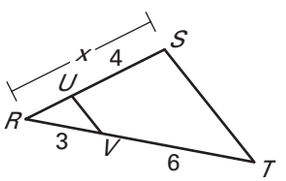
EXAMPLE 1 ## Use properties of proportions

In the diagram below $\frac{RU}{US} = \frac{RV}{VT}$. Find x.

a.



b.



Solution

a.

$\frac{RU}{US} = \frac{RV}{VT}$	Given
$\frac{5}{x} = \frac{20}{8}$	Substitution Property of Equality
$\frac{x}{5} = \frac{8}{20}$	Reciprocal Property
$x = 2$	Solve for x.

b.

$\frac{RU}{US} = \frac{RV}{VT}$	Given
$\frac{RU + US}{US} = \frac{RV + VT}{VT}$	Property 4
$\frac{x}{4} = \frac{3 + 6}{6}$	Substitution Property of Equality
$x = 6$	Solve for x.

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Study Guide *continued*

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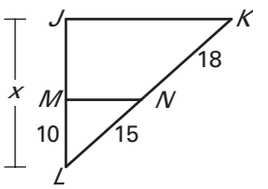
Exercises for Example 1

In the diagram, $\frac{JM}{ML} = \frac{KN}{NL}$.



1. Find JL.

2. Find JM.

EXAMPLE 2 Find the scale of a drawing

Highway A highway on a map is 9 inches long. The actual highway is 36 miles long. What is the scale of the map?

Solution

To find the scale, write the ratio of a length on the map to an actual length, then rewrite the ratio so that the denominator is 1.

$$\frac{\text{length on map}}{\text{length of highway}} = \frac{9 \text{ in.}}{36 \text{ mi}} = \frac{9 \text{ in.} \div 36}{36 \text{ mi} \div 36} = \frac{0.25 \text{ in.}}{1 \text{ mi}}$$

The scale of the map is 0.25 inch : 1 mile.

EXAMPLE 3 Use a scale drawing

Blueprint An architect's blueprint of a floor plan for a new condominium has a scale of 1.5 centimeters : 1 foot. With a ruler you measure the width of the kitchen on the blueprint to be about 22.5 centimeters. What is the actual width of the kitchen?

Solution

Let x represent the actual width in feet.

$$\frac{22.5 \text{ cm}}{x \text{ ft}} = \frac{1.5 \text{ cm}}{1 \text{ ft}} \quad \begin{matrix} \longleftarrow \text{width on blueprint} \\ \longleftarrow \text{actual width} \end{matrix}$$

$1.5x = 22.5$ Cross Products Property

$x = 15$ Solve for x.

The actual width of the kitchen is about 15 feet.

Exercises for Examples 2 and 3

3. A river on a map is 12.5 centimeters long. The actual river is 2.5 miles long. What is the scale of the map?

4. In Example 3, the width of the actual living room is 22 feet. What is the width of the living room on the blueprint?