

# 2-8

## Proportions and Similar Figures



### Vocabulary

#### Review

Do the ratios in each pair form a *proportion*? Explain.

1.  $\frac{2}{5}$  and  $\frac{10}{25}$

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2.  $\frac{1}{3}$  and  $\frac{30}{100}$

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#### Vocabulary Builder

**similar** (adjective) sim uh lur

**Related Word:** similarly (adverb)

**Definition:** Objects are **similar** if they are alike, but not necessarily identical.

**Main Idea:** In mathematics, **similar** figures have the same shape, but not necessarily the same size.

**similar figures**

same shape      different size

#### Use Your Vocabulary

3. Explain how a lion and a giraffe are *similar*.

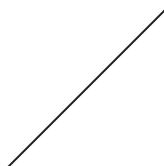
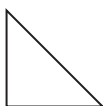
How is a lion like a giraffe?

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How is a lion different from a giraffe?

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4. Consider each pair of figures. Circle the figures that are *similar*.



The symbol  $\sim$  means “is similar to.” In Problem 1 below,  $\triangle ABC \sim \triangle DEF$ .

In similar figures, the measures of corresponding angles are equal, and corresponding side lengths are in proportion. In Problem 1, the pairs of corresponding sides are  $\overline{AB}$  and  $\overline{DE}$ ,  $\overline{AC}$  and  $\overline{DF}$ , and  $\overline{BC}$  and  $\overline{EF}$ .



### Problem 1 Finding the Length of a Side

**Got It?** In the diagram,  $\triangle ABC \sim \triangle DEF$ . What is  $AC$ ?



5. Underline the correct word or words to complete the sentence.

Because the triangles are similar, the ratios of the corresponding sides are  
 equal / not equal .

6. Use the diagram above. Circle the ratio that forms a proportion with  $\frac{BC}{EF}$ .

$\frac{AC}{DE}$      
   $\frac{AC}{EF}$      
   $\frac{AC}{DF}$      
   $\frac{AC}{AB}$

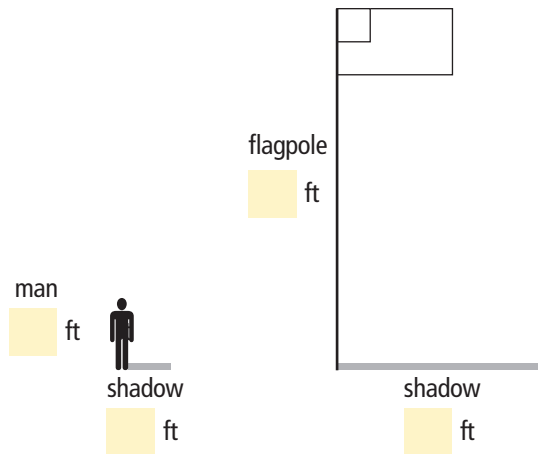
7. Use the ratios from Exercise 6 to write a proportion. Solve your proportion for  $AC$ .



### Problem 2 Applying Similarity

**Got It?** A man who is 6 ft tall is standing next to a flagpole. The shadow of the man is 3.5 ft and the shadow of the flagpole is 17.5 ft. What is the height of the flagpole?

8. Label the diagram. Let  $h$  = the height of the flagpole.



9. Complete the reasoning model below.

Think	Write
First I write a proportion to find the height, $h$ , of the flagpole.	$\frac{6}{\square} = \frac{h}{\square}$
Then I use the Cross Products Property.	$\square \cdot h = 6 \cdot \square$
Then I simplify.	$3.5h = \square$
Now I divide each side by 3.5.	$\frac{3.5h}{\square} = \frac{\square}{\square}$
And now I simplify.	$h = \square$
Finally I write a sentence to answer the question.	The height of the flagpole is $\square$ ft.



### Problem 3 Interpreting Scale Drawings

**Got It?** On a map the scale is 1 in. : 110 mi. The distance from Jacksonville to Gainesville on the map is about 0.6 in. What is the actual distance from Jacksonville to Gainesville?

10. Let  $x =$

11. Use the given information to write and solve a proportion.

12. The actual distance from Jacksonville to Gainesville is  miles.



### Problem 4 Using Scale Models

**Got It?** A scale model of a building is 6 in. tall. The scale of the model is 1 in. : 50 ft. How tall is the actual building?

13. Complete the equation in the model.

Relate  equals  $\frac{\text{model height}}{\text{actual height}}$

Define Let  $x$  = the actual height of the building.

Write 

14. Now write and solve a proportion.

15. The actual building is  ft tall.



### Lesson Check • Do you UNDERSTAND?

**Reasoning** Suppose  $\triangle ABC \sim \triangle TUV$ . Determine whether each pair of measures is equal.

the measures of  $\angle A$  and  $\angle T$       the perimeters of the two triangles      the ratios of the sides  $\frac{BC}{UV}$  and  $\frac{AC}{TV}$

**Underline the correct word to complete each sentence.**

16. In similar triangles, corresponding sides always have the same .

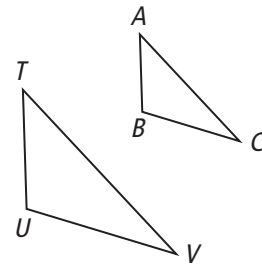
17. In similar triangles, corresponding angles always have  measures.

**Use the triangles at the right. Write T for true or F for false.**

18. The measures of  $\angle A$  and  $\angle T$  are equal.

19. The perimeters of the two triangles are equal.

20. The ratios  $\frac{BC}{UV}$  and  $\frac{AC}{TV}$  are equal.



### Math Success

Check off the vocabulary words that you understand.

similar figures

scale

scale drawing

scale model

Rate how well you can use proportions to solve similar-figure problems.

