Extension

Use after Lesson 3.6

Apply Proportions to Similar Figures

TEKS *a.1, A.3.A, A.4.A; 8.9.B*

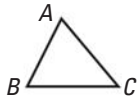
GOAL Use similar figures to solve problems.

Key Vocabulary
- **congruent figures**
- **similar figures**
- **corresponding parts**

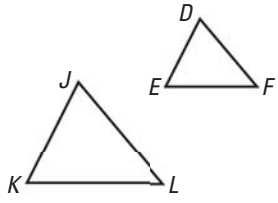
NAME SIMILAR FIGURES

When naming similar figures, list the letters of the corresponding vertices (corner points) in the same order.

Two figures are **congruent figures** if they have the same shape and size. The symbol ≅ indicates congruence. Of the triangles shown, $\triangle ABC \cong \triangle DEF$.



Two figures are **similar figures** if they have the same shape but not necessarily the same size. The symbol ~ indicates that two figures are similar. All the triangles shown are similar; in particular, $\triangle ABC \sim \triangle JKL$.



The sides or angles that have the same relative position within two figures are called **corresponding parts**.

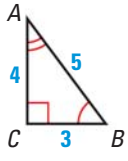
NAME LENGTHS OF SIDES

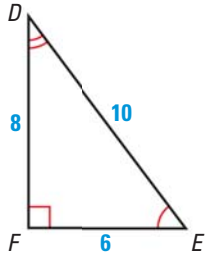
AB represents the length of the side whose endpoints are *A* and *B*.

KEY CONCEPT *For Your Notebook*

Properties of Similar Figures

In the diagram, $\triangle ABC \sim \triangle DEF$.





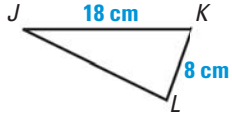
1. Corresponding angles of similar figures are congruent.
   $\angle A \cong \angle D, \angle B \cong \angle E, \angle C \cong \angle F$
2. The ratios of the lengths of corresponding sides of similar figures are equal.
   $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = \frac{1}{2}$

EXAMPLE 1 Find an unknown side length

Given $\triangle JKL \sim \triangle QRS$, find *QR*.

Solution

Use the ratios of the lengths of corresponding sides to write a proportion.

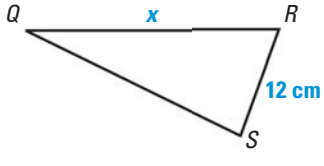


$\frac{JK}{QR} = \frac{KL}{RS}$ Write proportion involving *QR*.

$\frac{18}{x} = \frac{8}{12}$ Substitute.

$216 = 8x$ Cross products property

$27 = x$ Divide each side by 8.



▶ *QR* is 27 centimeters.