

**5-5****Similar Figures and Proportions**

*Learn* to use ratios to determine if two figures are similar.

## Vocabulary

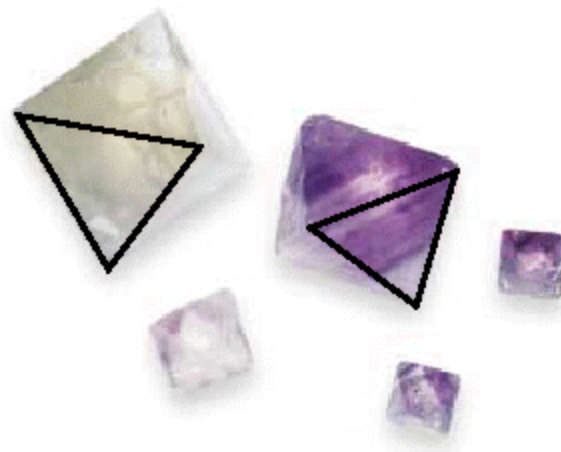
similar

corresponding sides

corresponding angles

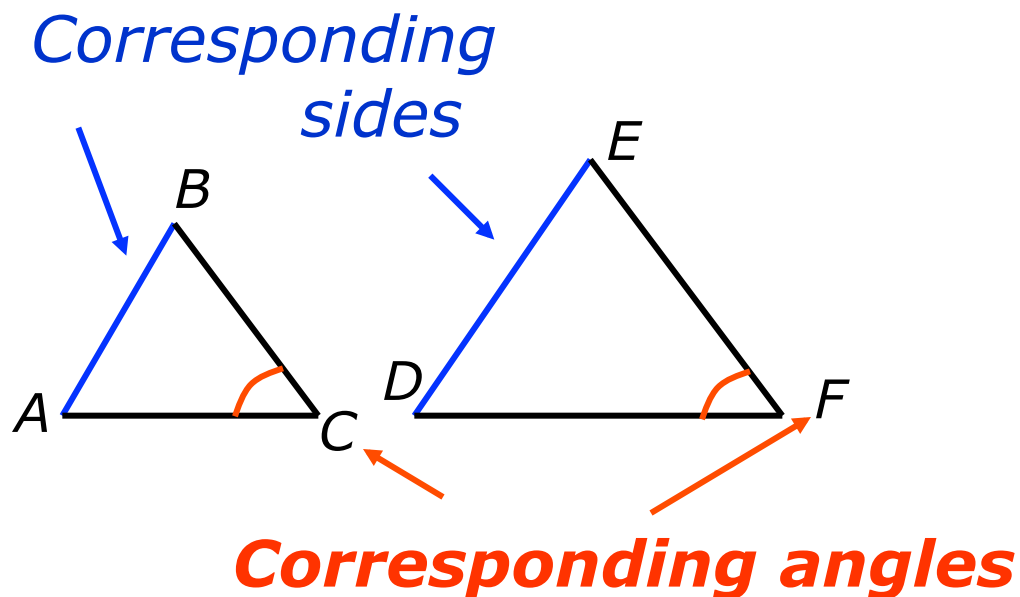
## 5-5 Similar Figures and Proportions

Octahedral fluorite is a crystal found in nature. It grows in the shape of an octahedron, which is a solid figure with eight triangular faces. The triangles in different-sized fluorite crystals are *similar* figures. **Similar figures have the same shape but not necessarily the same size.**



## 5-5 Similar Figures and Proportions

Matching sides of two or more polygons are called **corresponding sides**, and matching angles are called **corresponding angles**.



**SIMILAR FIGURES**

If two figures are similar, then the measures of the corresponding angles are equal and the ratios of the lengths of the corresponding sides are proportional.

To find out if triangles are similar, determine whether the ratios of the lengths of their corresponding sides are proportional. If the ratios are proportional, then the corresponding angles must have equal measures.

**5-5**

# Similar Figures and Proportions

## Reading Math

A side of a figure can be named by its endpoints, with a bar above.

$\overline{AB}$

Without the bar, the letters indicate the *length* of the side.

# 5-5 Similar Figures and Proportions

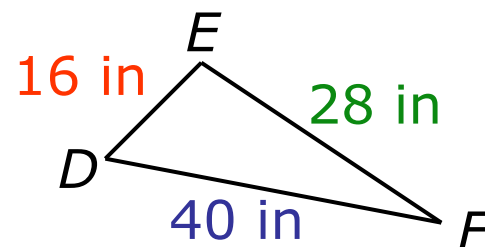
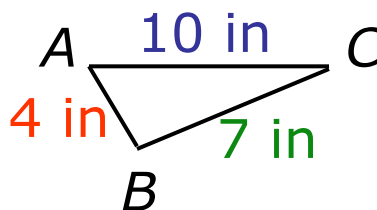
## Additional Example 1: Determining Whether Two Triangles Are Similar

Identify the corresponding sides in the pair of triangles. Then use ratios to determine whether the triangles are similar.

$\overline{AB}$  corresponds to  $\overline{DE}$ .

$\overline{BC}$  corresponds to  $\overline{EF}$ .

$\overline{AC}$  corresponds to  $\overline{DF}$ .



$$\frac{AB}{DE} \stackrel{?}{=} \frac{BC}{EF} \stackrel{?}{=} \frac{AC}{DF}$$

*Write ratios using the corresponding sides.*

$$\frac{4}{16} \stackrel{?}{=} \frac{7}{28} \stackrel{?}{=} \frac{10}{40}$$

*Substitute the length of the sides.*

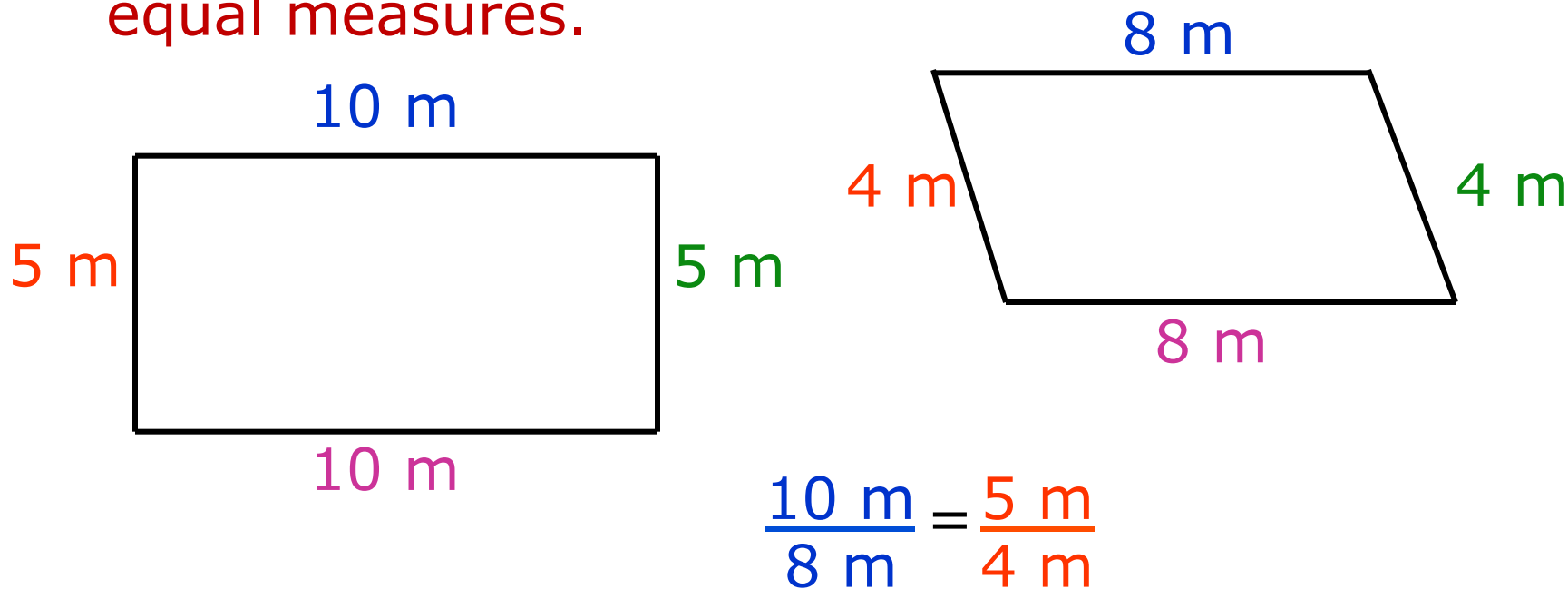
$$\frac{1}{4} \stackrel{?}{=} \frac{1}{4} \stackrel{?}{=} \frac{1}{4}$$

*Simplify each ratio.*

Since the ratios of the corresponding sides are equivalent, the triangles are similar.

**5-5****Similar Figures and Proportions**

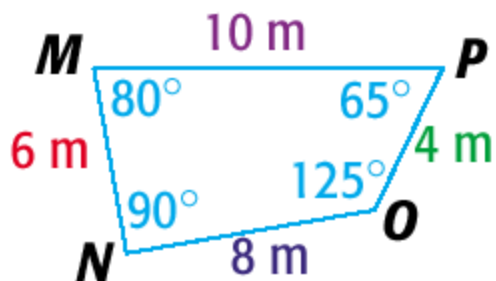
In figures with four or more sides, it is possible for the corresponding side lengths to be proportional and the figures to have different shapes. **To find out if these figures are similar, first check that their corresponding angles have equal measures.**



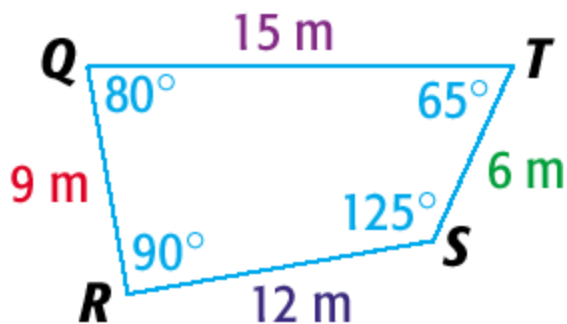


**5-5****Similar Figures and Proportions****Additional Example 2: Determining Whether Two Four-Sided Figures are Similar**

Use the properties of similarity to determine whether the figures are similar.



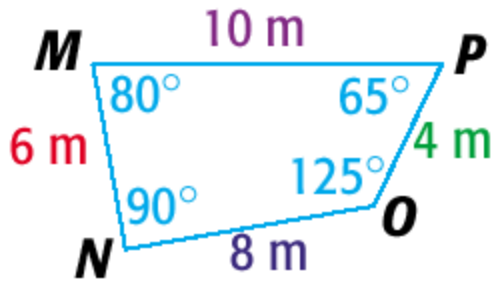
The corresponding angles of the figures have equal measure.



Write each set of corresponding sides as a ratio.

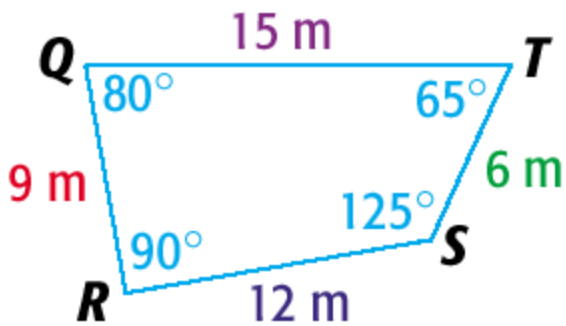
# 5-5 Similar Figures and Proportions

## Additional Example 2 Continued



$\frac{MN}{QR}$   $\overline{MN}$  corresponds to  $\overline{QR}$ .

$\frac{NO}{RS}$   $\overline{NO}$  corresponds to  $\overline{RS}$ .



$\frac{OP}{ST}$   $\overline{OP}$  corresponds to  $\overline{ST}$ .

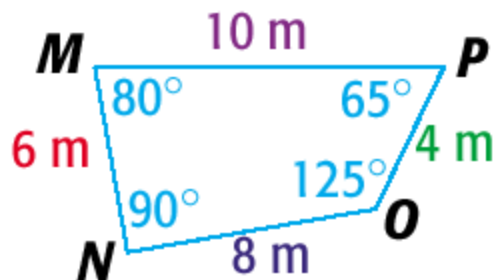
$\frac{MP}{QT}$   $\overline{MP}$  corresponds to  $\overline{QT}$ .

## 5-5

## Similar Figures and Proportions

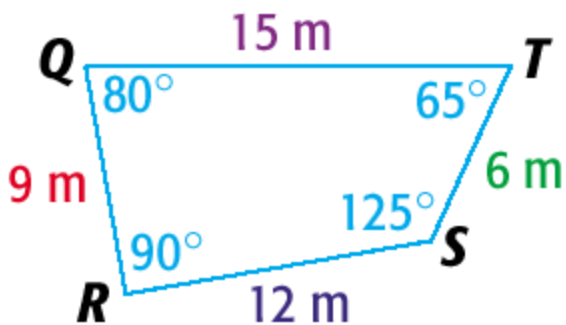
## Additional Example 2 Continued

Determine whether the ratios of the lengths of the corresponding sides are proportional.



$$\frac{MN}{QR} \stackrel{?}{=} \frac{NO}{RS} \stackrel{?}{=} \frac{OP}{ST} \stackrel{?}{=} \frac{MP}{QT}$$

$$\frac{6}{9} \stackrel{?}{=} \frac{8}{12} \stackrel{?}{=} \frac{4}{6} \stackrel{?}{=} \frac{10}{15}$$



$$\frac{2}{3} \stackrel{?}{=} \frac{2}{3} \stackrel{?}{=} \frac{2}{3} \stackrel{?}{=} \frac{2}{3}$$

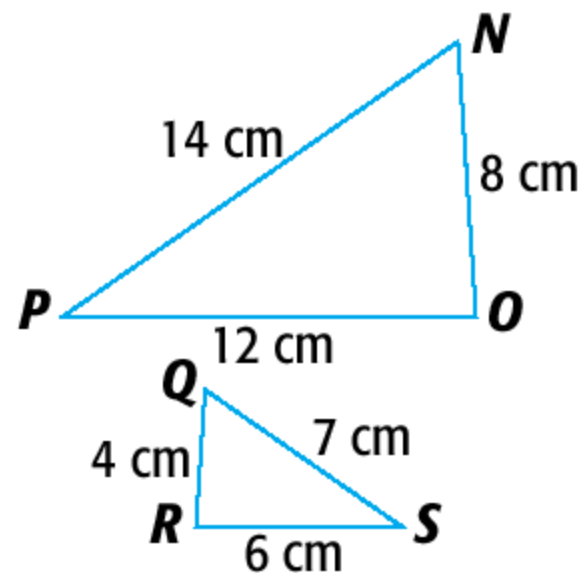
Since the ratios of the corresponding sides are equivalent, the figures are similar.

## 5-5

## Similar Figures and Proportions

## Lesson Quiz: Part 1

1. Identify the corresponding sides in the pair of triangles, and use ratios to determine whether the triangles are similar.



$\overline{NO}$  corresponds to  $\overline{QR}$ ;

$\overline{PO}$  corresponds to  $\overline{SR}$ ;

$\overline{PN}$  corresponds to  $\overline{SQ}$ ; similar

**5-5****Similar Figures and Proportions****Lesson Quiz**

2. Use properties of similarity to determine whether the figures are similar.

not similar

