Warm Up

Find the cross products, and then tell whether the ratios are equal.

1. $\frac{16}{6}, \frac{40}{15}$

2. $\frac{3}{8}, \frac{18}{46}$

3. $\frac{8}{9}, \frac{24}{27}$

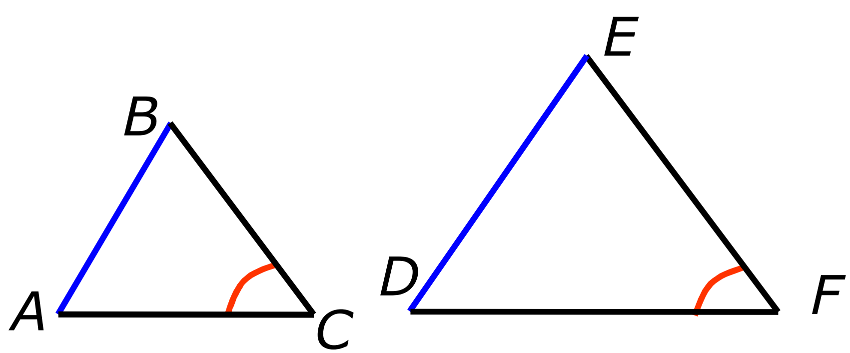
4. $\frac{28}{12}, \frac{42}{18}$

Problem of the Day

Every 8th telephone pole along a road has a red band painted on it. Every 14th pole has an emergency call phone on it. What is the number of the first pole with both a red band and a call phone?

Similar figures are figures that have the same shape but not necessarily the same size. The symbol ~ means "is similar to."

Corresponding angles of two or more similar polygons are in the same relative position. **Corresponding sides** of two or more similar polygons are in the same relative position. When naming similar figures, list the corresponding angles in the same order. For the triangles below, $\Delta ABC \sim \Delta DEF$.



SIMILAR FIGURES

Two figures are similar if

- the measures of their corresponding angles are equal.
- the ratios of the lengths of the corresponding sides are proportional.

Reading Math

A side of a figure can be named by its endpoints, with a bar above such as;

$$AB$$

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

4-8 Similar Figures and Proportions

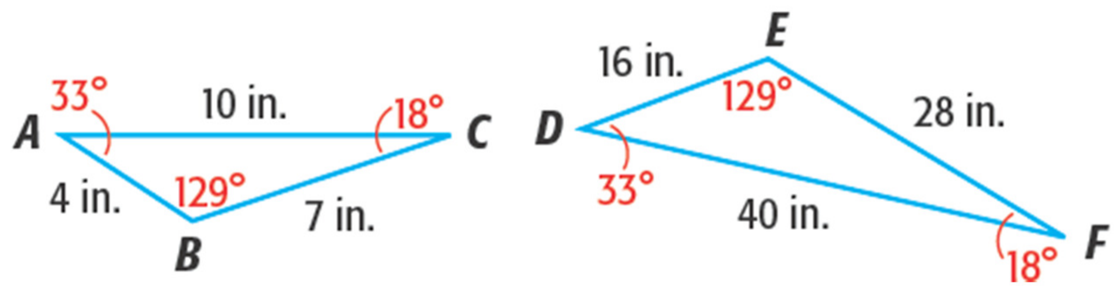
Additional Example 1: Determining Whether Two Triangles Are Similar

Tell 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.*

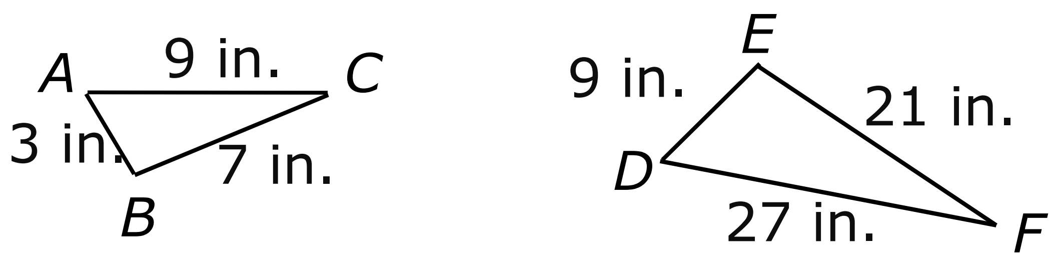
$$\frac{4}{16} \stackrel{?}{=} \frac{7}{28} \stackrel{?}{=} \frac{10}{40}$$ *Substitute the length of the sides.*

$$\frac{1}{4} \stackrel{?}{=} \frac{1}{4} \stackrel{?}{=} \frac{1}{4}$$ *Simplify each ratio.*

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

Check It Out: Example 1

Tell whether the triangles are similar.

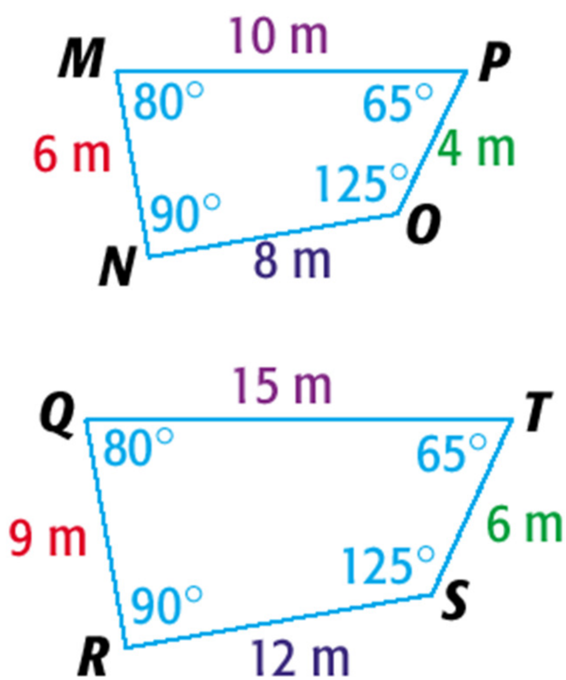


$\overline{AB}$ corresponds to $\overline{DE}$; $\overline{BC}$ corresponds to $\overline{EF}$; $\overline{AC}$ corresponds to $\overline{DF}$.

$\frac{\boxed{AB}}{\boxed{DE}} \stackrel{?}{=} \frac{\boxed{BC}}{\boxed{EF}} \stackrel{?}{=} \frac{\boxed{AC}}{\boxed{DF}}$; $\frac{3}{9} = \frac{7}{21} = \frac{9}{27}$; the triangles are similar.

Additional Example 2: Determining Whether Two Four-Sided Figures are Similar

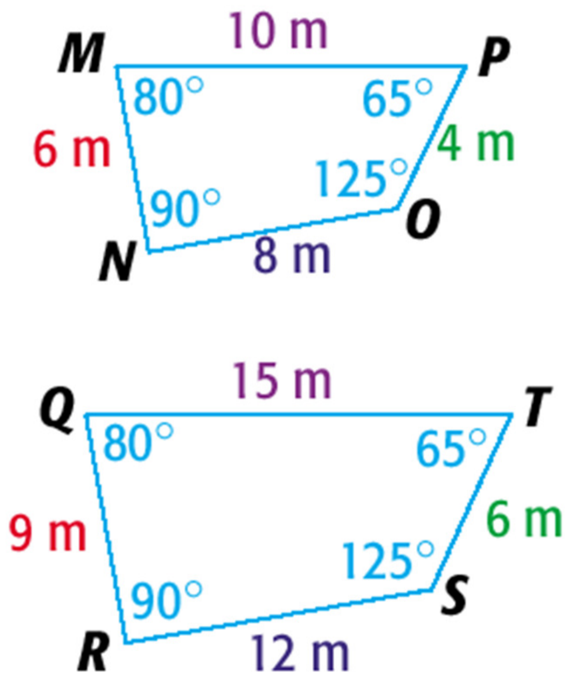
Tell whether the figures are similar.



The corresponding angles of the figures have equal measure.

Write each set of corresponding sides as a ratio.

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 $\overline{QT}$.

Additional Example 2 Continued

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

$\frac{MN}{QR} \stackrel{?}{=} \frac{NO}{RS} \stackrel{?}{=} \frac{OP}{ST} \stackrel{?}{=} \frac{MP}{QT}$ *Write ratios using corresponding sides.*

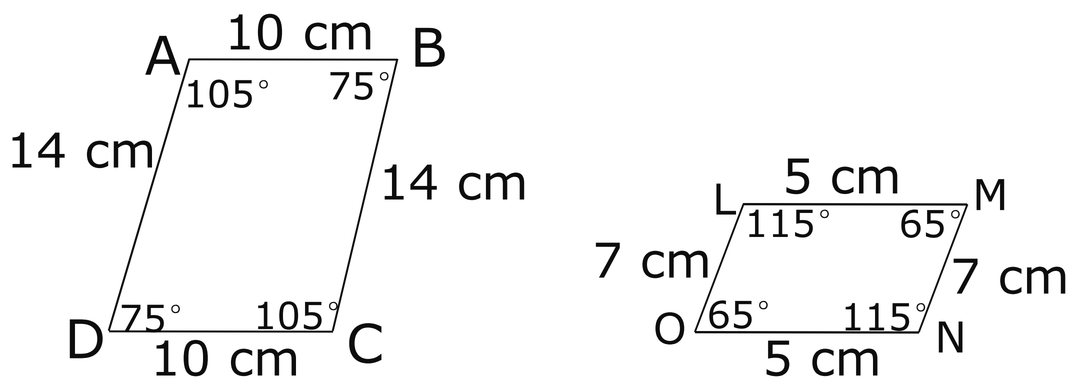
$\frac{6}{9} \stackrel{?}{=} \frac{8}{12} \stackrel{?}{=} \frac{4}{6} \stackrel{?}{=} \frac{10}{15}$ *Substitute the length of the sides.*

$\frac{2}{3} \stackrel{?}{=} \frac{2}{3} \stackrel{?}{=} \frac{2}{3} \stackrel{?}{=} \frac{2}{3}$ *Simplify each ratio.*

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

Check It Out: Example 2A

Tell whether the figures are similar.



No; the corresponding angles of the figures do not have equal measures.

Check It Out: Example 2B

Tell whether the figures are similar.