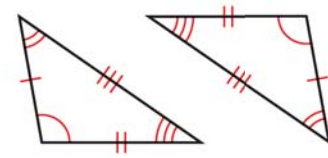# Congruent and Similar Figures TEKS G.10.A, G.11.A, G.11.B
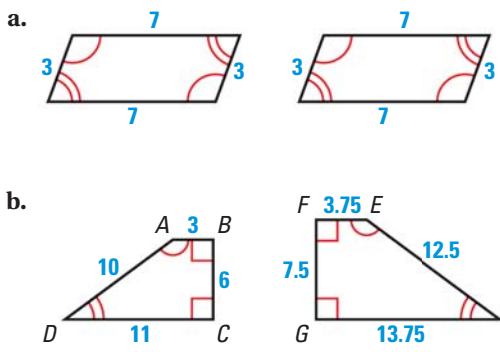
Two figures are **congruent** if they have the same shape and the same size. If two figures are congruent, then corresponding angles are congruent and corresponding sides are congruent. The triangles at the right are congruent. Matching arcs show congruent angles, and matching tick marks show congruent sides.

Two figures are **similar** if they have the same shape but not necessarily the same size. If two figures are similar, then corresponding angles are congruent and the ratios of the lengths of corresponding sides are equal.

EXAMPLE Tell whether the figures are *congruent*, *similar*, or *neither*.

a.

As shown, corresponding angles are congruent and corresponding sides are congruent. So, the figures are congruent.

b.

As shown, corresponding angles are congruent, but corresponding sides have different lengths. So, the figures are not congruent, but they may be similar.
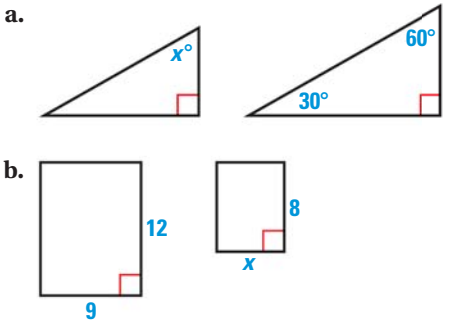
The figures are similar if the ratios of the lengths of corresponding sides are equal.

$$\frac{AB}{EF} = \frac{3}{3.75} = 0.8 \qquad \frac{BC}{FG} = \frac{6}{7.5} = 0.8 \qquad \frac{CD}{GH} = \frac{11}{13.75} = 0.8 \qquad \frac{AD}{EH} = \frac{10}{12.5} = 0.8$$

▶ Because corresponding angles are congruent and the ratios of the lengths of corresponding sides are equal, *ABCD* is similar to *EFGH*.

EXAMPLE The two polygons are similar. Find the value of *x*.

a.

The angle with measure $x°$ corresponds to the angle with measure 60°, so $x = 60$.

b.

The side with length 12 corresponds to the side with length 8, and the side with length 9 corresponds to the side with length x.

$$\frac{12}{8} = \frac{9}{x} \qquad \text{Write a proportion.}$$

$$12x = 72 \qquad \text{Cross multiply.}$$

$$x = 6 \qquad \text{Solve for } x.$$