Determine whether each pair of polygons is similar. Explain. (Example 1)

1.

$$\cancel{\frac{3}{?} = \frac{5}{13}} \quad 25 = 39$$

NOT similar

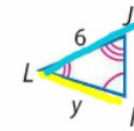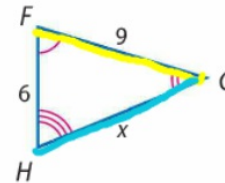**3.** The two triangles are similar. (Example 2)

a. Determine the transformations that map one figure onto the other.

Sample answer: rotation and dilation

b. Find the missing side measures. $GH = 12; KL = 4.5$

4. The two triangles are similar. (Example 2)

$$\frac{3x}{3} = \frac{36}{3}$$
$$x = 12$$

$$\cancel{\frac{x}{6} = \frac{6}{3}} = \frac{9}{y}$$
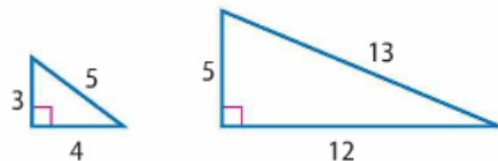
$$6y = \frac{27}{6}$$
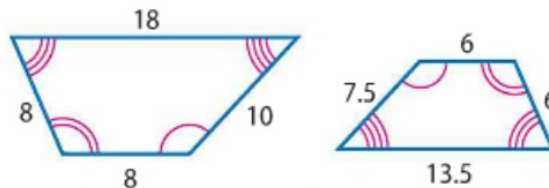$$y = 4.5$$

Guided Practice

Determine whether each pair of polygons is similar. Explain. (Example 1)

1.

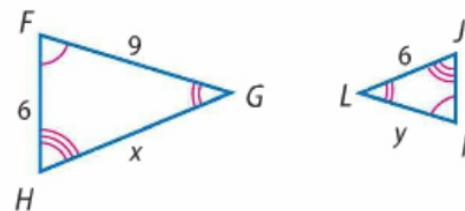No; $\frac{5}{3} \neq \frac{13}{5}$.

2.

Yes; the corresponding angles are congruent and $\frac{8}{6} = \frac{8}{6} = \frac{10}{7.5} = \frac{18}{13.5}$.
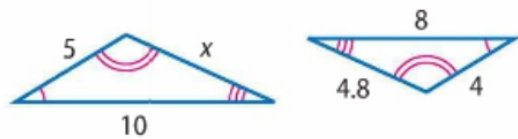
3. The two triangles are similar. (Example 2)

    a. Determine the transformations that map one figure onto the other.

       Sample answer: rotation and dilation

    b. Find the missing side measures. $GH = 12; KL = 4.5$

4. The two triangles are similar. (Example 2)

a. Determine the transformations that map one figure onto the other.
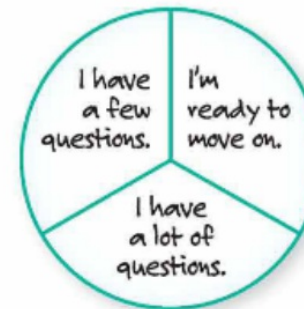
  rotation, translation, and dilation

b. Find the missing side measure. **6**

5. ⓔ **Building on the Essential Question** How does the scale factor of a dilation relate to the ratio of two of the corresponding sides of the preimage and the image?

  The scale factor and the ratio are equal.

Determine whether each pair of polygons is similar. Explain. (Example 1)

1

3   7

4

8
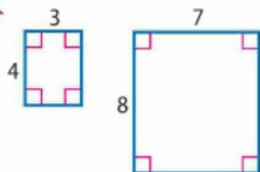
No; The corresponding angles are congruent, but $\frac{3}{7} \neq \frac{4}{8}$.

2.

5   5

3   3

3   3   5   5
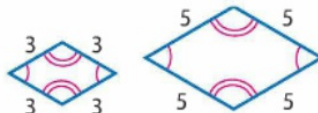
Yes; The corresponding angles are congruent and $\frac{3}{5} = \frac{3}{5}$.

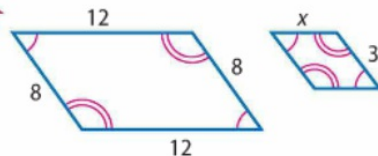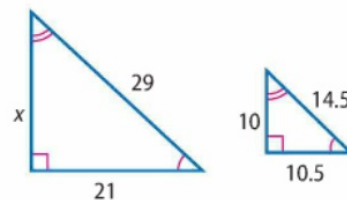**Each pair of polygons is similar. Determine the transformations that map one figure onto the other. Then find the missing side measures.** (Example 2)
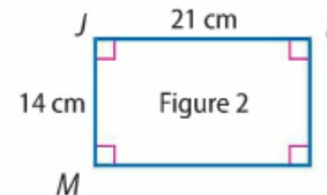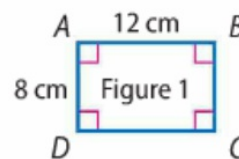
3

12

x

8   3

8

12

translation and dilation; 4.5

4.

29

x

14.5

10

21   10.5

translation and dilation; 20

5. **CCSS** **Persevere with Problems** The figures at the right are similar.

A   12 cm   B

8 cm   Figure 1

D   C

J   21 cm   K

14 cm   Figure 2

M   L

a. Find the area of both figures.

Figure 1: 96 cm²; Figure 2: 294 cm²

b. Compare the scale factor of the side lengths and the ratio of the areas.
**Sample answer: The scale factor of the side lengths is $\frac{14}{8}$ or $\frac{7}{4}$. The ratio of the areas is $\frac{49}{16}$. The ratio of the areas is the scale factor of the side lengths squared.**

6. **STEM** The scale factor from the model of a human inner ear to the actual ear is 55:2. If one of the bones of the model is 8.25 centimeters long, how long is the actual bone in a human ear? **0.3 cm**

7. **CCSS Model with Mathematics** Refer to the graphic novel frame below. The brochure says that the rope is 500 feet long. Use the properties of similar triangles to find the parasailer's height above the water. **400 ft**

2.5 ft

2 ft

Hmmm. I wonder how far we'll be above the water?
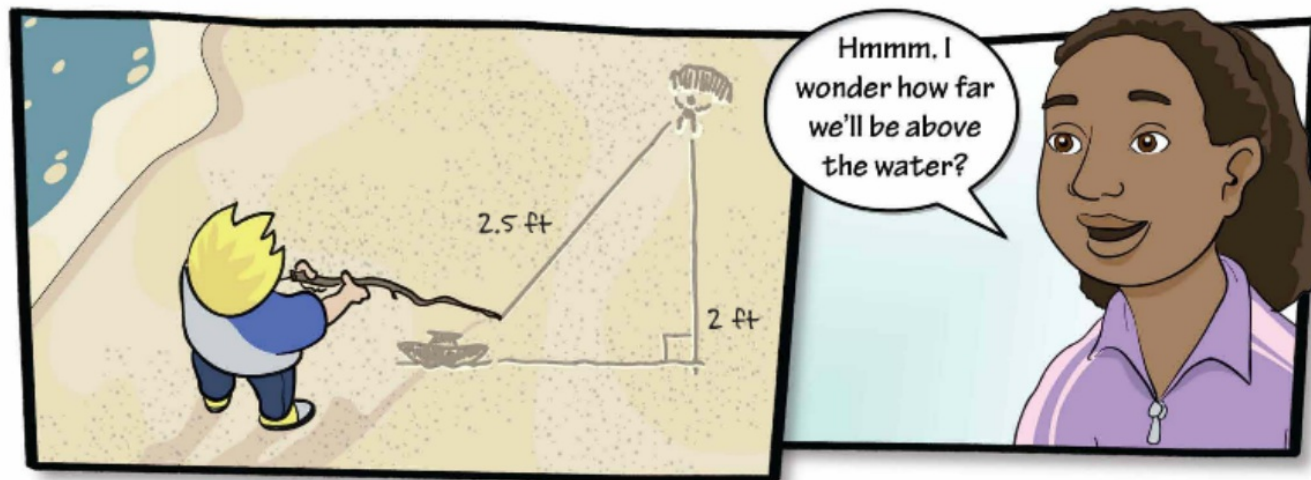
H.O.T. Problems Higher Order Thinking

8. **CCSS Persevere with Problems** Suppose two rectangles are similar with a scale factor of 2. What is the ratio of their areas? Explain. **1:4 or 4:1;**

Choose two rectangles with a scale factor of 2, 2 by 4 and 4 by 8.

Compare the areas, 8 and 32.

CCSS **Justify Conclusions** Determine whether each statement is *true* or *false*. If true, explain your reasoning. If false, provide a counterexample.

9. All rectangles are similar.

false; Sample answer: In rectangles, all corresponding angles are congruent but not all sides are proportional. Rectangle *A* is not similar to Rectangle *B*, since $\frac{4}{4} \neq \frac{1}{2}$.
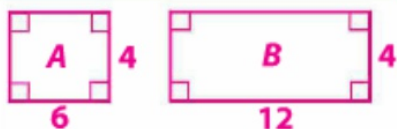
10. All squares are similar.

true; Sample answer: Since all four angles in a square are right angles, all corresponding angles between squares are congruent. In addition, all sides in a square are congruent. Therefore, all four ratios of corresponding sides are equal.

11. **CCSS** **Model with Mathematics** Draw two similar polygons in the space provided. Include the measures of the sides on your drawing, and identify the scale factor. See students' work.