

What you will learn about:
Similar and Congruent Figures

Similar Figures:

1) Corresponding Sides are proportional

2) Corresponding Angles are \cong .

$A' \rightarrow A$ prime

$A'' \rightarrow A$ Double prime

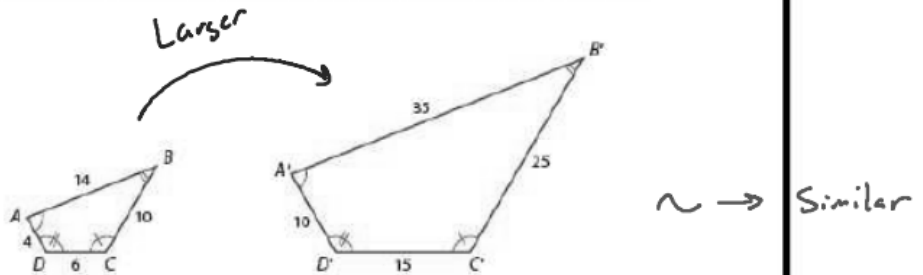
Scale Factor (K)

Ratio of Sides

Enlargement $|K| > 1$

Reduction $|K| < 1$

Two polygons with the same number of sides are similar provided that their corresponding angles have the same measure and the corresponding sides are in the same ratio or proportion.



In the above diagram quadrilateral $A'B'C'D' \sim$ quadrilateral $ABCD$.

- List the pairs of congruent angles.

$$\angle A \cong \angle A' \quad \angle C \cong \angle C'$$

$$\angle B \cong \angle B' \quad \angle D \cong \angle D'$$

- Find the ratio of the corresponding sides.

$$\frac{AB}{A'B'} = \frac{BC}{B'C'} = \frac{CD}{C'D'} = \frac{AD}{A'D'}$$

$$\frac{14}{35} = \frac{10}{25} = \frac{6}{15} = \frac{4}{10} = \frac{2}{5}$$

- If two polygons are similar, describe how to find the scale factor from the larger polygon to the smaller polygon? How would you find the scale factor from the smaller polygon to the larger polygon?

$$L \rightarrow S \quad K = \frac{2}{5} \quad \begin{array}{l} \text{Smaller} \\ \text{Bigger} \end{array}$$

$$S \rightarrow L \quad K = \frac{5}{2} \quad \begin{array}{l} \text{Bigger} \\ \text{Smaller} \end{array}$$

$$x^2 + x^2 = 2^2$$

$$2x^2 = 4$$

$$x^2 = 2$$

$$x = \sqrt{2}$$

$$\left(\frac{\sqrt{2}}{2}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2$$

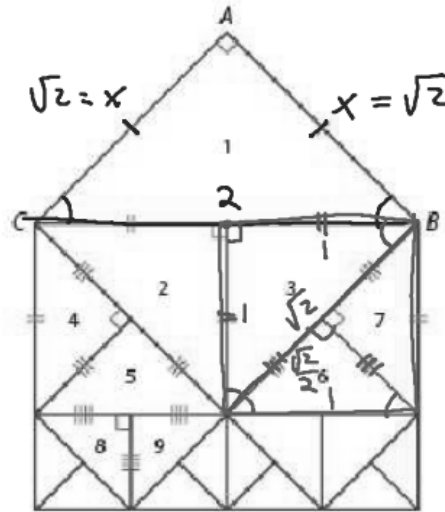
$$\frac{2}{4} + \frac{2}{4} = \frac{4}{4} = 1$$

$$\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$2 = \sqrt{4}$$

$$2 = 2$$

4. The diagram below is a framework for Escher's artwork that you examined in the think about this situation. Recall that $\triangle ABC$ is an isosceles right triangle. Assume that $BC = 2$ units.



$$1^2 + 1^2 = c^2$$

$$1 + 1 = c^2$$

$$2 = c^2$$

$$c = \sqrt{2}$$

Determine if each statement is correct. If so give the scale factor from the first triangle to the second. If it false explain why.

a. $\triangle 1 \sim \triangle 3$

$$\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$K = \frac{1}{\sqrt{2}}$$

c. $\triangle 4 \sim \triangle 6$

b. $\triangle 2 \sim \triangle 6$

$$\frac{\frac{\sqrt{2}}{2}}{1} = \frac{\frac{\sqrt{2}}{2}}{1} = \frac{1}{\sqrt{2}}$$

d. $\triangle 8 \sim \triangle 3$

$$K = \frac{1}{\sqrt{2}}$$

e. $\triangle 9 \sim \triangle 1$

5. Based on their work in Problem 4, several students at Black River High School made conjectures about families of polygons. Each student tried to outdo the previous student. For each claim, explain as precisely as you can why it is true or give a counterexample to show why it is false.

a. Monisha conjectured that all isosceles right triangles are similar.

b. Ahmed conjectured that all equilateral triangles are similar.

c. Loreen claimed that all squares are similar.

d. Jeff conjectured that all rhombi are similar.

e. Amy claimed that all regular Hexagons are similar.