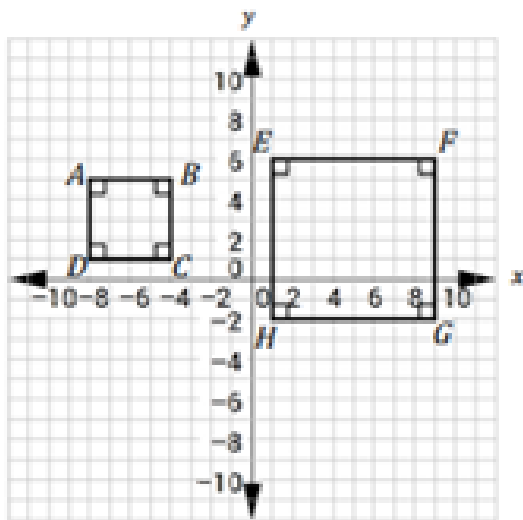- _____ is the type of transformation that results in similar figures.
- Similarity preserves congruence of corresponding _____.
- Similarity maintains the proportionality of corresponding _____.

Congruent Triangles are _____ similar triangles.
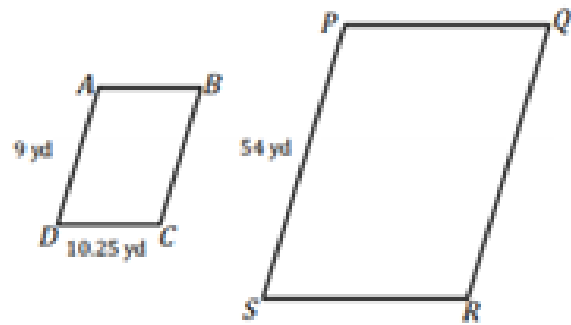
Similar Triangles are _____ congruent triangles.

Based on the two similar squares above, name the properties of similar poygons, and give the justifications that prove the figures are similar.

#	Properties	Justifications
1.		
2.		
3.		
4.		

Each _____ side of a polygon can be multiplied by the _____ to get the length of its _____side on a similar polygon. Then, the _____ of the _____ is the _____ of the _____ while the _____ of _____ is the _____.

Example:

Parallelograms ABCD and PQRS are similar.

a.) What is the scale factor from PQRS to ABCD?

b.) What is the length of $\overline{RS}$?

Example:

Mrs. Kemp's rectangular garden has a length of 20 meters and a width of 15 meters. Her neighbor, Mr. Pippen, has a garden similar in shape with a scale factor of 3.

a.) What is the width of Mr. Pippen's garden?

b.) How do the areas of the gardens relate to one another?

Example:

A right triangle has a base of 11 yards and a height of 7 yards. If you were to construct a similar but not congruent right triangle with area of 616 square yards, what would the dimensions of the new triangle be?
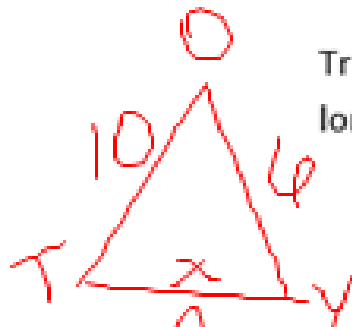
Example:

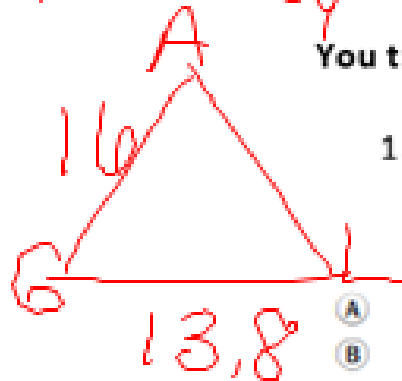The areas of two similar polygons are in the ratio of 25:81. Find the ratio fo the corresponding sides.

$$\frac{\sqrt{25}}{\sqrt{81}} = \frac{a^2}{b^2} \qquad \frac{5}{9}$$

You try:

Triangle TOY is similar to triangle GAL. $\overline{TO}$ is 10 inches long, $\overline{OY}$ is 6 inches long, $\overline{GA}$ is 16 inches long, and $\overline{GL}$ is 13.8 inches long. How long is $\overline{TY}$?

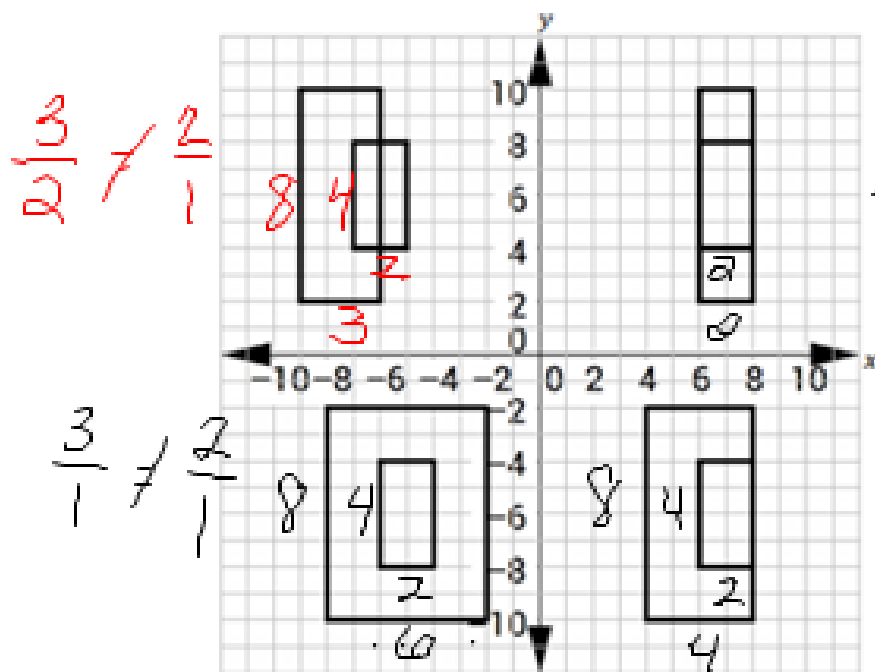$$\frac{10}{16} = .625 \qquad 13.8(.625)$$

$$8.625$$

You try:

1. Which transformation would result in the perimeter of a polygon being different from the perimeter of its pre-image?
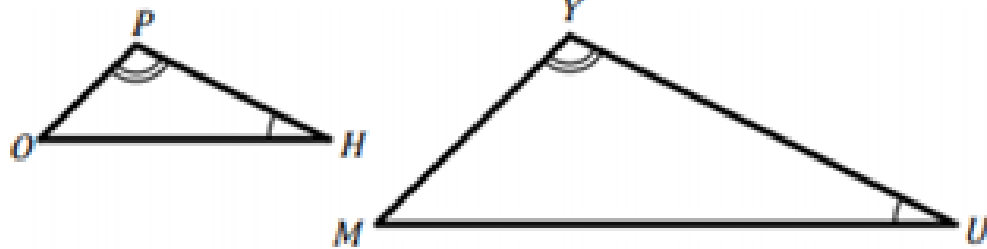
   Ⓐ $(x, y) \rightarrow (-x, -y)$

   Ⓑ $(x, y) \rightarrow (y, x)$

   Ⓒ $(x, y) \rightarrow (3x, 3y)$

   Ⓓ $(x, y) \rightarrow (x - 3, y + 1)$

2. Which quadrant has two similar polygons? Justify your answer.

$\frac{3}{2} \neq \frac{2}{1}$

$8 \quad 4$

2

3

$\frac{3}{1} \neq \frac{2}{1}$

$8 \quad 4$

2

60

$\frac{1}{1}$

$8 \quad 4$

2

4

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

Quadrant (IV)

$\triangle PHO \sim \triangle YUM$

$\cong \Rightarrow$ congruent

$\sim \Rightarrow$ similar

List the corresponding sides and angles of the triangles above.

$\angle P \cong \angle Y$

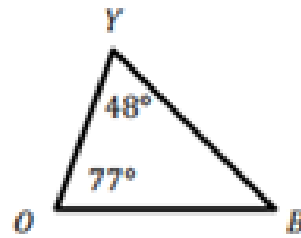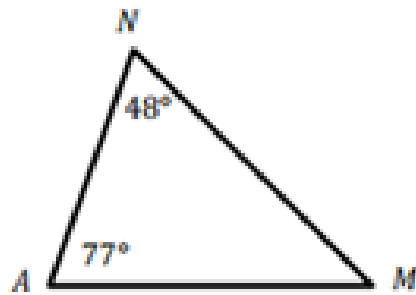$\angle H \cong \angle U$

$\angle O \cong \angle M$

$$\frac{PH}{YU} = \frac{HO}{UM} = \frac{PO}{YM}$$

Angle - Angle Similarity (AA~)

If two __angles__ of one triangle are __congruent__
to two __angles__ of another triangle, then the two
triangles are __similar__.

In triangle ABC, $m\angle A = 90^0$ and $\angle B = 35^0$. In triangle DEF, $m\angle E = 35^0$ and $m\angle F = 55^0$. Are the triangles similar? Prove your answer.
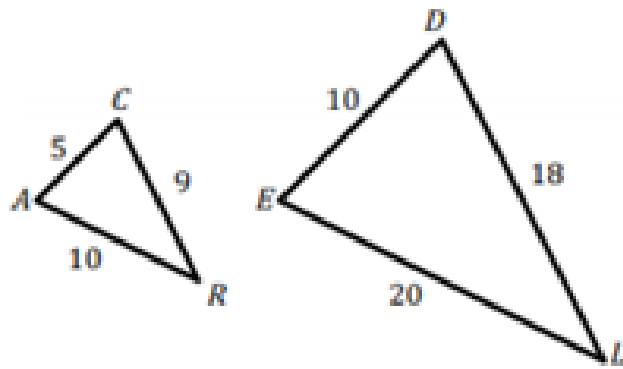
$$\begin{array}{r} 90 \\ +\ 35 \\ \hline 125^\circ \end{array} \qquad \begin{array}{r} 180 \\ -\ 125 \\ \hline 55^\circ \end{array}$$

So $m\angle C = 55^\circ$

Determine $m\angle M$. $55°$

Determine $m\angle B$. $55°$

$$\begin{array}{r} 48 \\ +77 \\ \hline 125 \end{array}$$

$$\begin{array}{r} 180 \\ -125 \\ \hline 55° \end{array}$$

Prove that $\triangle CRA \sim \triangle DLE$.

$$\frac{20}{10} = \frac{2}{1}$$

$$\frac{18}{9} = \frac{2}{1}$$

$$\frac{10}{5} = \frac{2}{1}$$

Side-Side-Side Similarity (SSS~)

If the ___lengths___ of the corresponding ___sides___ of two triangles are ___proportional___, then the triangles are ___similar___
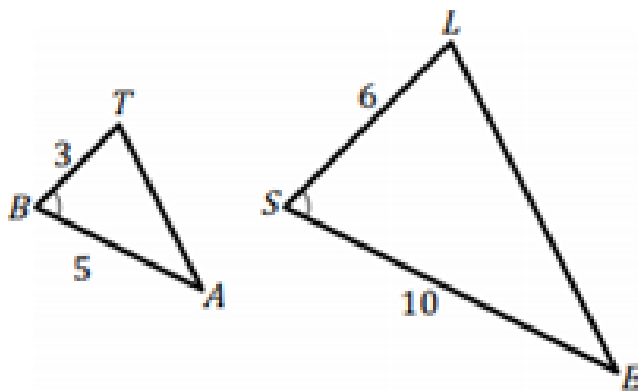
$$\frac{10}{5} = \frac{2}{1} \qquad \frac{6}{3} = \frac{2}{1}$$

$$\angle B \cong \angle S$$

Prove that $\Delta TAB \sim \Delta LES$

SAS ~

If the **lengths** of two **sides** are **proportional** and their **included angle** are **congruent** on two different triangles, then the triangles are **similar**.