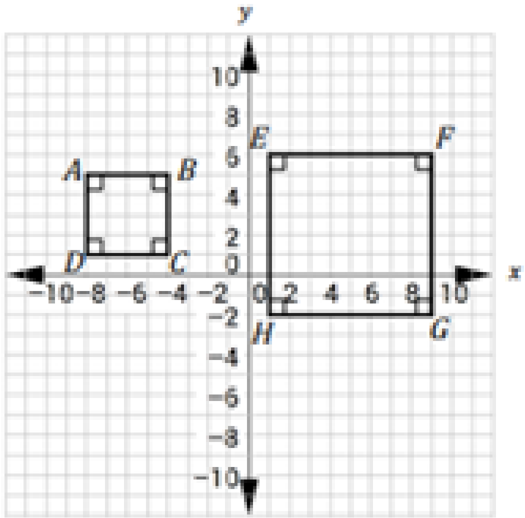
- ______________________ is the type of transformation that results in similar figures.
- Similarity preserves congruence of corresponding _________________.
- Similarity maintains the proportionality of corresponding _________________.

Congruent Triangles are ______________________ similar triangles.

Similar Triangles are ______________________ congruent triangles.



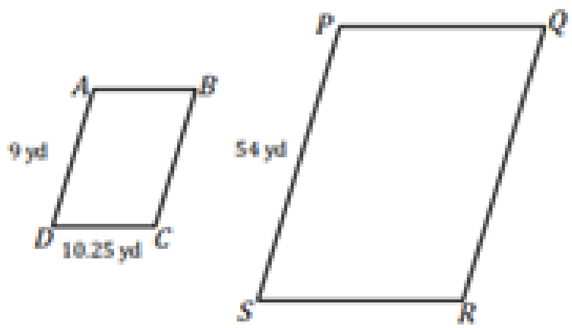
Based on the two similar squares above, name the properties of similar poygons, and give the justifications that prove the figures are similar.

#	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.

You try:

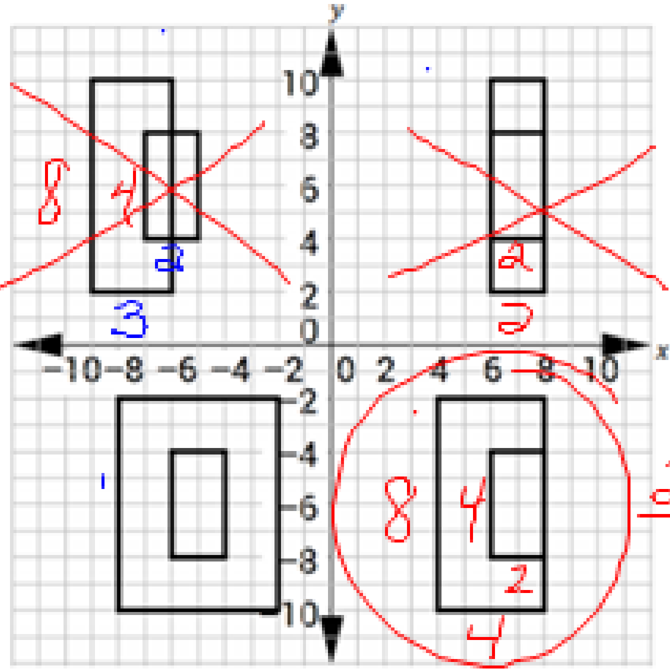
Triangle TOY is similar to triangle GAL. $\overline{TO}$ is 10 inches long, $\overline{OY}$ is 6 inches long, $\overline{GA}$ is 16 inches long, and $\overline{GL}$ is 13.8 inches long. How long is $\overline{TY}$?

You try:

1. Which transformation would result in the perimeter of a polygon being different from the perimeter of its pre-image?

- (A) $(x, y) \to (-x, -y)$
- (B) $(x, y) \to (y, x)$
- (C) $(x, y) \to (3x, 3y)$
- (D) $(x, y) \to (x - 3, y + 1)$

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



$\frac{1}{1}$

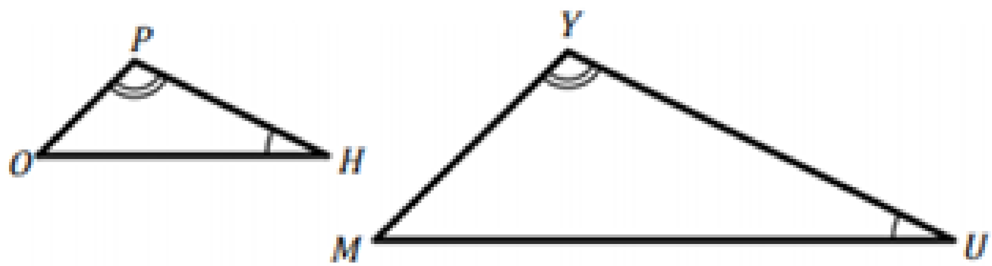
$\frac{2}{1} = \frac{2}{1}$

4

$$\Delta PHO \sim \Delta YUM$$

$\cong \Rightarrow$ congruent

$\sim \Rightarrow$ similar



List the corresponding sides and angles of the triangles above.

$\angle P \cong \angle Y$

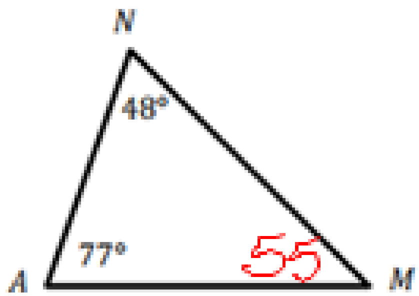
$\angle H \cong \angle U$

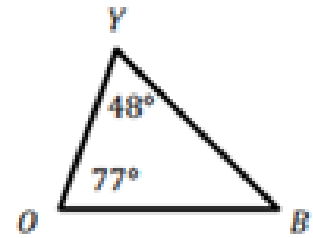
$\angle O \cong \angle M$

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

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

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





Determine $m\angle M$. 55°

Determine $m\angle B$. 55°

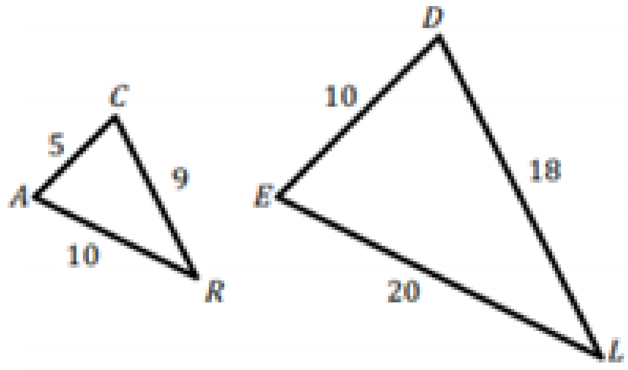
Angle - Angle - Similarity

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.

$$\begin{array}{r} 90 \\ +35 \\ \hline 125 \end{array} \qquad \begin{array}{r} 180 \\ -125 \\ \hline 55^\circ \end{array}$$

yes, by AA~



$$\frac{10}{5} = \frac{2}{1} \quad \frac{18}{9} = \frac{2}{1}$$

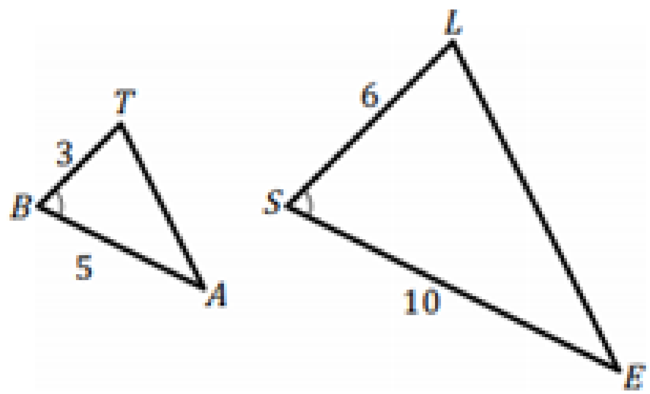
$$\frac{20}{10} = \frac{2}{1}$$

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

Similar

SSS Similarity

If the lengths of the corresponding sides of two triangles are proportional, then the triangles are similar



$\angle B \cong \angle S$

$\frac{3}{6} = \frac{1}{2}$

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

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

SAS Similarity

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

Suppose that you have ΔTRA and ΔSED, and $\frac{TR}{SE} = \frac{AT}{DS}$. Identify the criterion that proves that the two triangles are similar given each additional statement.

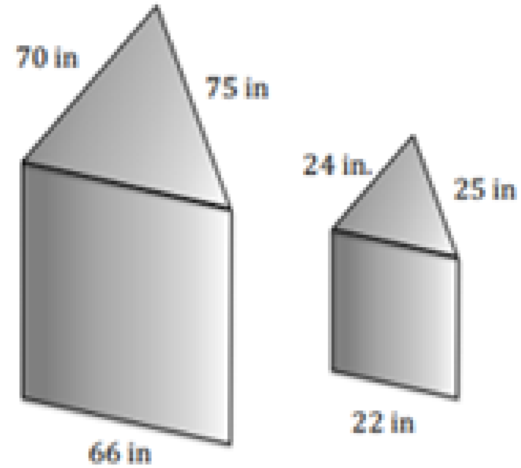
$\angle R \cong \angle E$

SAS ~

$\frac{TR}{SE} = \frac{RA}{ED}$

SSS ~

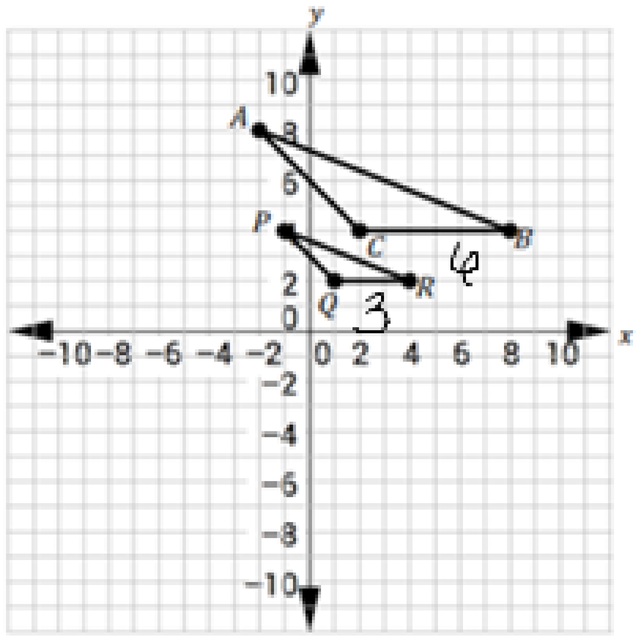
1. An artist is designing a sculpture for the town square that will contain two triangular solids. The artist wants the triangles in the bases of each solid to be similar.



a. Are the triangles similar? Justify your answer.

$\frac{75}{25} = \frac{3}{1}$ $\frac{70}{24} = 2.9916$ Not $\sim$

b. If the triangles are not similar, what measurement(s) could be changed to make them similar? Justify your answer. 70 to 72 $\frac{72}{24} = \frac{3}{1}$



$\frac{2}{1}$ or $\frac{1}{2}$

2.

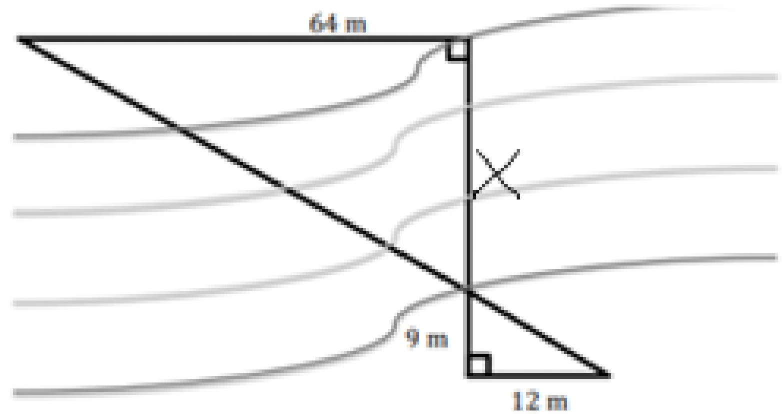
Prove $\Delta ACB \sim \Delta PQR$ by applying properties of transformations. Justify your steps.

P $(-1, 4)$

$\times 2 \quad \times 2$

P$'(-2, 8)$ A$(-2, 8)$

3. A surveyor is measuring the width of a river for a future bridge.



a. What similarity criterion can be used to prove that the triangles are similar?

SAS~

b. Use the properties of similar triangles to set up a proportion and determine the width of the river.

$$\frac{x}{9} = \frac{64}{12}$$

$$\frac{12x}{12} = \frac{576}{12}$$

$$x = 48\ m$$