Name:_____ Date:_____ Per._____

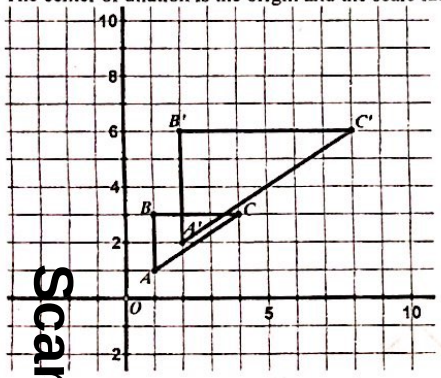
U11 CWK #3 *Similarity* ⇒ Same shape(angles), dif. Size

In the Unit 10, we discussed congruence. Two figures are **congruent** if one can be obtained from the other by a rigid motion (rotation, reflection, or translation) or a sequence of rigid motions. If you can move one of the figures using one of these transformation or a series of these transformations so that it fits exactly on the other one, the two figure are congruent.

In this section we have seen problems where two figures are similar. In 7th grade, you learned that two figures are similar if they have the **same shape** – they may or may not be the same size. In 8th grade, we define similarity in terms of transformations. Two figures are said to be **similar** if there is a dilation, or sequence of transformations that includes dilations, that take one figure onto the other.

While studying dilations, we have learned that (1) a dilation creates a figure that is the same shape as the original figure but a different size, (2) the measure of corresponding angles is the same and (3) the ratios of corresponding sides are all the same. Since similar figures are produced by a dilation, these properties, as well as some others we observed, also hold true for similar figures.

Let's revisit a problem we have seen before. In the picture below, ΔABC has been dilated to obtain $\Delta A'B'C'$. The center of dilation is the origin and the scale factor is 2.



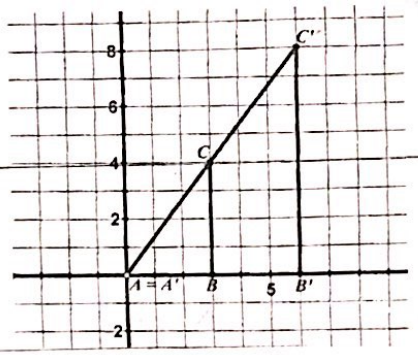
Similarity ↙ ~

Because $\Delta A'B'C'$ was produced by a dilation of ΔABC, the two triangles are similar. We can write a similarity statement for the two triangles. You can denote that two figures are similar by using the symbol ~ and listing their vertices in corresponding order. (The order the vertices is written tells us which segments and angles are corresponding in the figures.) When two figures are similar, corresponding angles are congruent and corresponding sides are proportional. The ratio of the lengths of the corresponding sides is a similarity ratio.

Write a similarity statement for the two triangles. $\Delta ABC \sim \Delta A'B'C'$

Write the congruent statements to represent this. $\angle A \cong \angle A'$ $\angle B \cong \angle B'$ $\angle C \cong \angle C'$

Write the similarity ratio for these two triangles. $\overline{AB} \sim \overline{A'B'}$ $\overline{AC} \sim \overline{A'C'}$ $\overline{BC} \sim \overline{B'C'}$



a. Write a similarity statement for the triangles.

$\Delta ABC \sim \Delta A'B'C'$

b. Complete each statement:

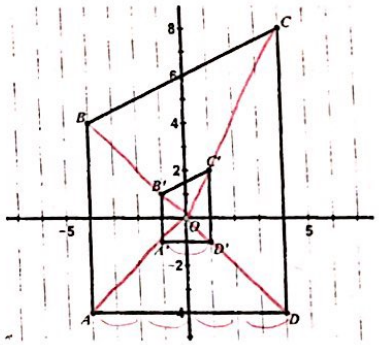
$m\angle C \cong m\angle C'$

If $m\angle B = 90°$, then $m\angle B' =$ 90°

$\frac{A'C'}{AC} =$ 2

$\frac{A'B'}{AB} = 2$

2. In the picture below, $ABCD$ has been dilated to obtain $A'B'C'D'$. The center of dilation is the origin.



a. Write a similarity statement for the trapezoids.

$ABCD \sim A'B'C'D'$

b. Complete each statement.

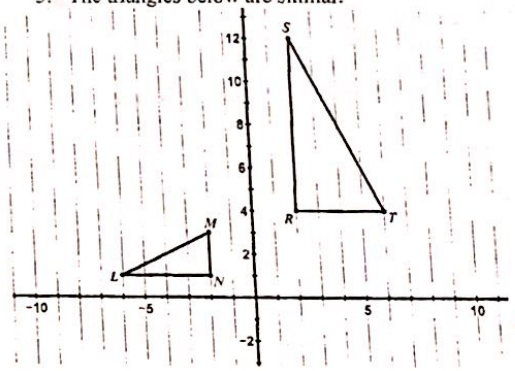
$m\angle C \cong m\angle C'$

If $m\angle A = 90°$, then $m\angle A' =$ 90°

$\frac{A'D'}{AD} = \frac{2}{8} = \frac{1}{4}$

$\frac{A'B'}{AB} = \frac{1}{4}$

3. The triangles below are similar.



a. Write a similarity statement for the triangles.

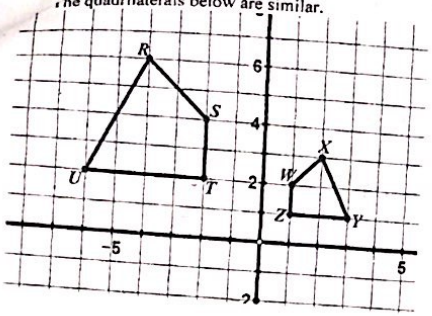
$\overline{LN} \sim \overline{SR}$ $\angle L \sim \angle S$

$\overline{MN} \sim \overline{TR}$ $\angle M \sim \angle T$

$\overline{LM} \sim \overline{ST}$ $\angle N \sim \angle R$

$\Delta LMN \sim \Delta STR$

...he quadrilaterals below are similar.



a. Write a similarity statement for the quadrilaterals.

$\overline{RS} \sim \overline{XW}$ $\quad \angle R \sim \angle X$

$\overline{ST} \sim \overline{WZ}$ $\quad \angle S \sim \angle W$

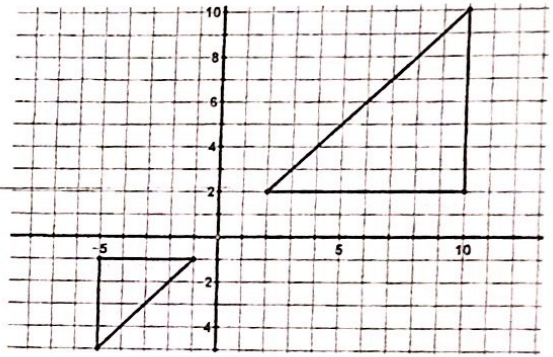
$\overline{RU} \sim \overline{XY}$ $\quad \angle T \sim \angle Z$

$\overline{TU} \sim \overline{ZY}$ $\quad \angle U \sim \angle Y$

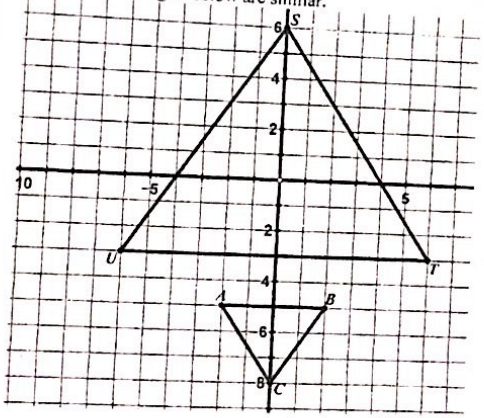
$RSTU \sim XWYZ$

Congruent (Similar) Neither

ratio/scale factor same



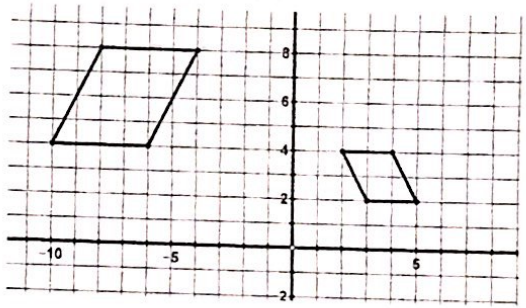
5. The triangles below are similar.



a. Write a similarity statement for the triangles.

$\triangle STU \sim \triangle CBA$

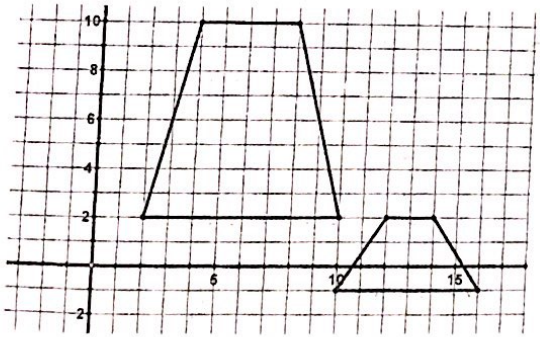
$\triangle STU \sim \triangle CAB$



Congruent (Similar) Neither

ratio/scale factor same

Directions: For each of the next transformations, determine whether the figures below are congruent, similar, or neither and circle your choice. Then provide a justification for your answer.



Congruent Similar (Neither)

dif. ratios between side lengths

Congruent Similar Neither

Same side lengths