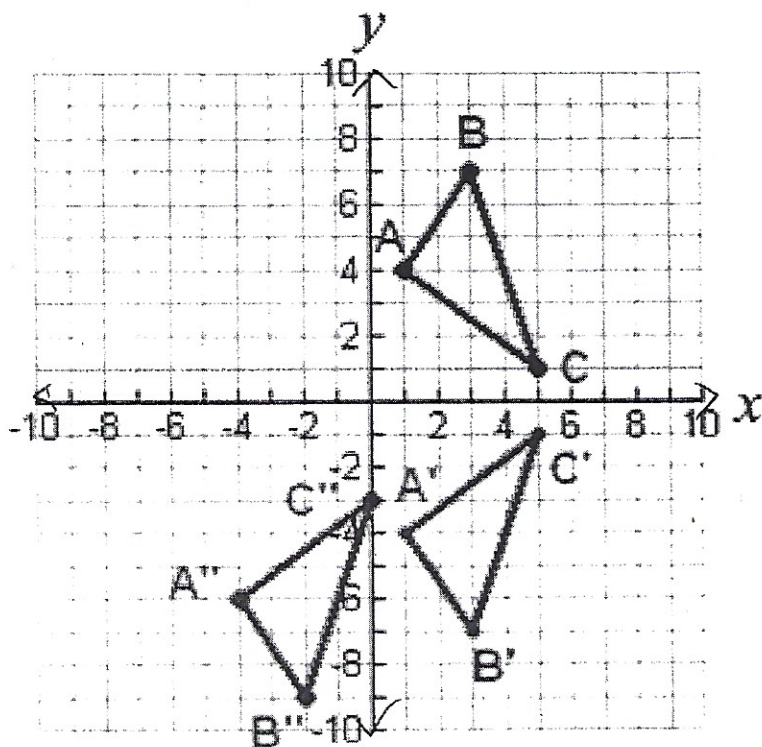


Composition of Transformations

When two or more transformations are combined to form a new transformation, the result is called a **composition of transformations**. In a composition, the first transformation produces an image upon which the second transformation is then performed.

Example: Given triangle ABC : $A(1,4)$, $B(3,7)$, $C(5,1)$ Graph the image that is a reflection in the x -axis followed by a translation five units to the left and two units down.



Triangle $A'B'C'$ is the reflection in the x -axis.

Then triangle $A''B''C''$ is the translation of $T(-5,-2)$.

$$A''(-4,-6), B''(-2,-9), C''(0,-3)$$

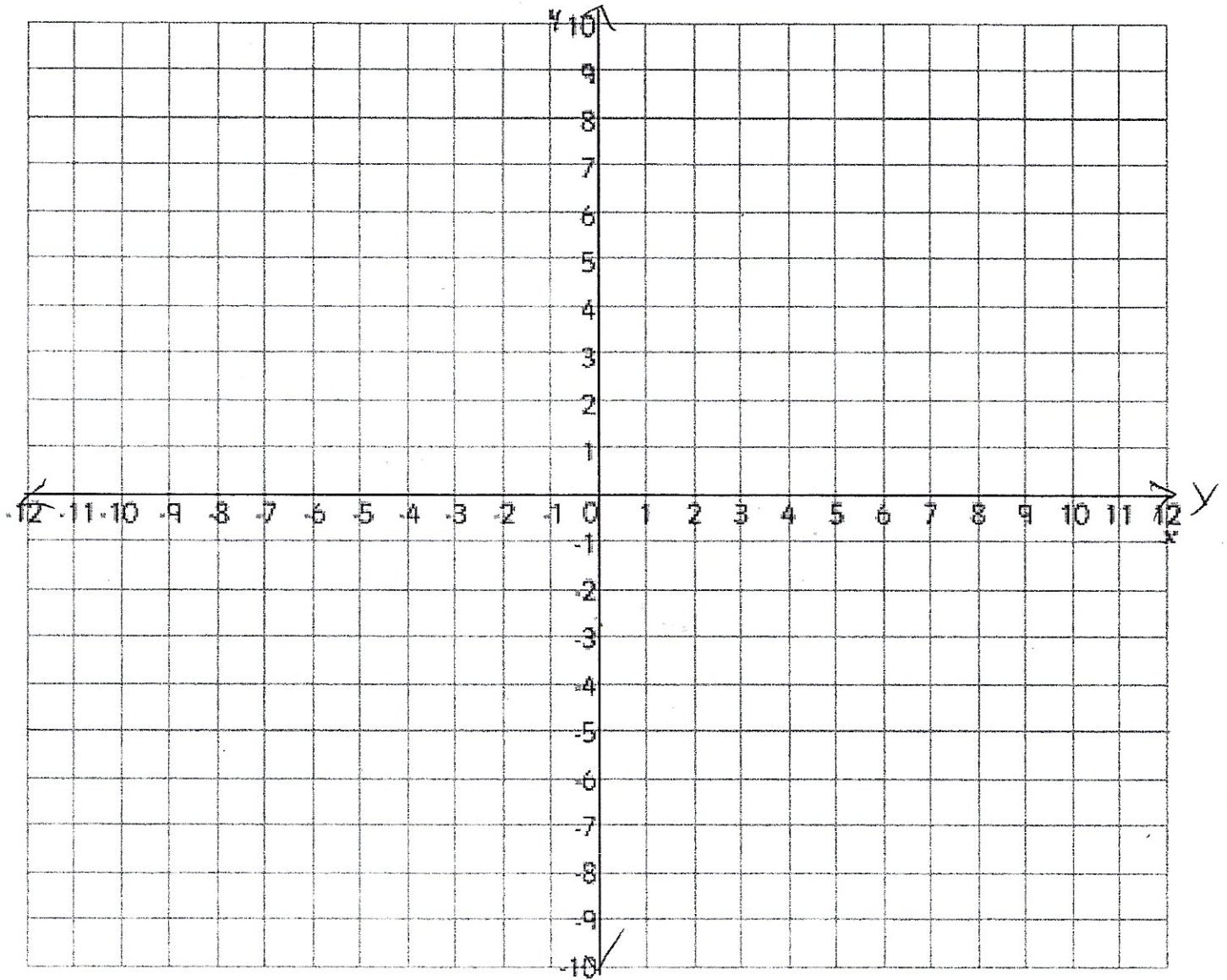
Is $\Delta A''B''C''$ congruent or similar to ΔABC ?

*Translations, reflections, and rotations are called **rigid transformations**, because they do not change the size or shape of a figure. These transformations produce **congruent** figures. Characteristics such as the length of line segments, angle measures, and parallel lines are unchanged by these types of transformations.

* Dilations are transformations that change the size, but not the shape of a figure. After a dilation, the image is **similar** to the original figure. Therefore dilations produce **non-rigid** transformations. In a dilation only the lengths of the line segments change. The angle measures remain the same.

1. a) Given triangle $A(-9,-3)$, $B(-3,3)$, $C(0,0)$, draw the image formed by a dilation with scale factor $\frac{1}{3}$ to form triangle $A'B'C'$. Translate triangle $A'B'C'$ 1 unit to the right and 4 units down to form $\Delta A''B''C''$.

b) Is $\Delta A''B''C''$ congruent or similar to ΔABC ? _____



$A(\quad , \quad)$ $A'(\quad , \quad)$ $A''(\quad , \quad)$

$B(\quad , \quad)$ $B'(\quad , \quad)$ $B''(\quad , \quad)$

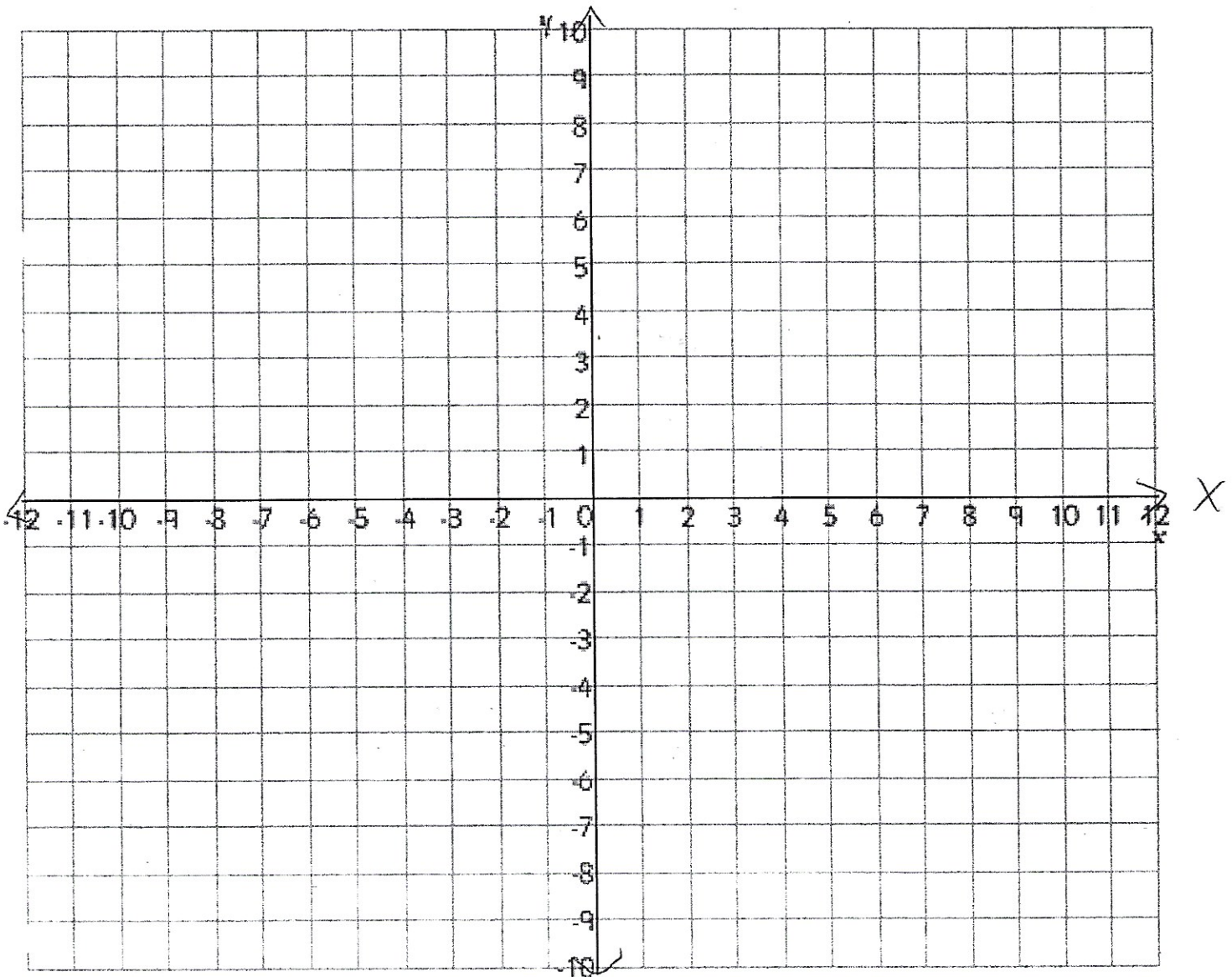
$C(\quad , \quad)$ $C'(\quad , \quad)$ $C''(\quad , \quad)$

2. a) Given triangle $C(5,4)$, $A(1,4)$, $T(3,0)$, draw the image formed by a reflection in the y-axis, and then a rotation of 90° counterclockwise about the origin.

b) Write the coordinates of $\Delta C'A'T'$ and $\Delta C''A''T''$

$C($	$,$	$)$	$C'($	$,$	$)$	$C''($	$,$	$)$
$A($	$,$	$)$	$A'($	$,$	$)$	$A''($	$,$	$)$
$T($	$,$	$)$	$T'($	$,$	$)$	$T''($	$,$	$)$

c) Is $\Delta C''A''T''$ congruent or similar to ΔCAT ? _____



3. a) Given triangle $Q(-5,-1)$, $R(-3,3)$, $S(0,-1)$ draw the image formed by a dilation with scale factor 2 followed by a translation of $T(x + 1, y + 4)$.

Complete the chart to help you graph.

Q (-5,-1)	Q'	Q''
R (-3,3)	R'	R''
S (0,-1)	S'	S''

b) Is $\Delta Q''R''S''$ congruent or similar to ΔQRS ? _____

