

Sequences/Compositions of Transformations

Combining Rigid Transformations

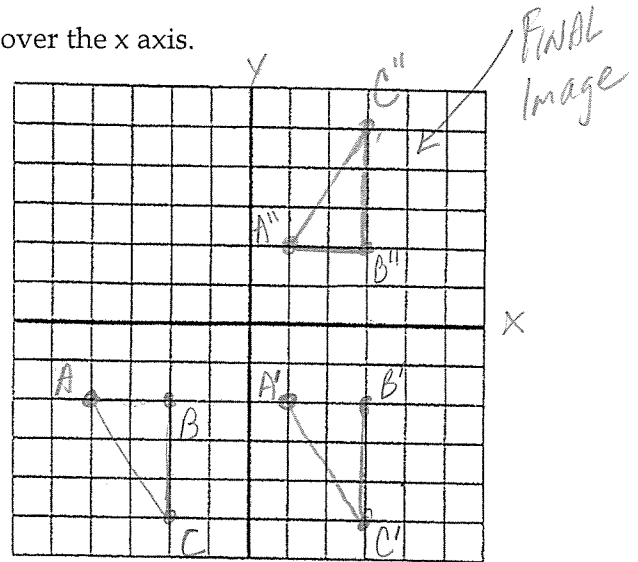
Ex: A GLIDE REFLECTION!

A glide reflection is a transformation in which every point P is mapped onto a point P'' by the following steps: *Is a rigid motion/isometry.*

- a) *perform a translation*
 - b) *carry out a reflection*
- order can be reversed.*

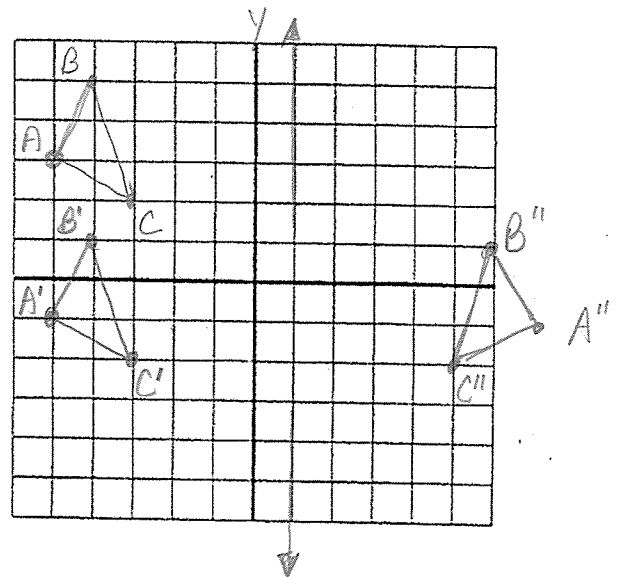
1. Translate $\triangle ABC$ by the vector $\langle 5, 0 \rangle$ and then reflect over the x axis.

$$\begin{aligned} A(-4, -2) &\rightarrow A'(1, -2) \\ B(-2, -2) &\rightarrow B'(3, -2) \\ C(-2, -5) &\rightarrow C'(3, -5) \end{aligned}$$



2. Translate $\triangle ABC$ by the vector $\langle 0, -4 \rangle$ and then reflect over $x=1$.

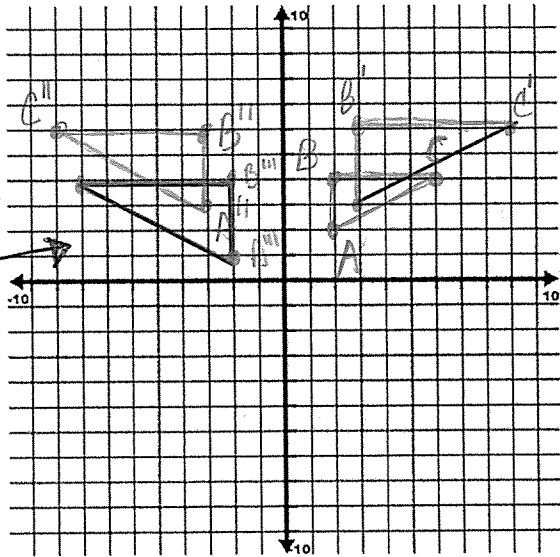
$$\begin{aligned} A(-5, 3) &\rightarrow A'(-5, -1) \\ B(-4, 5) &\rightarrow B'(-4, 1) \\ C(-3, 2) &\rightarrow C'(-3, -2) \end{aligned}$$



4. Draw the image of the figure in the plane after the given combination of transformations and describe the sequence.

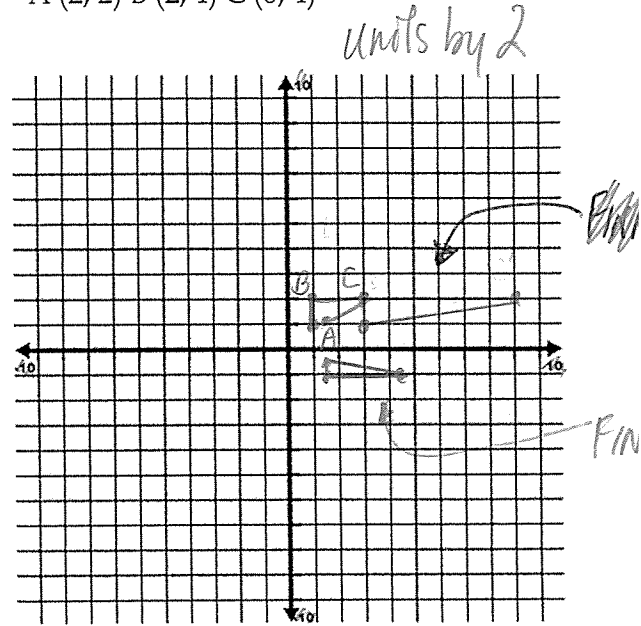
a) $(x, y) \xrightarrow{A'} \left(\frac{3}{2}x, \frac{3}{2}y\right) \xrightarrow{A''} (-x, y) \xrightarrow{A'''} (x+1, y-2)$

A (2, 2) B (2, 4) C (6, 4)



b) $(x, y) \xrightarrow{A'} (3x, y) \xrightarrow{A''} \left(\frac{1}{2}x, -\frac{1}{2}y\right)$

A (2, 2) B (2, 4) C (6, 4)



$A'(3, 3) \rightarrow A''(-3, 3) \rightarrow A'''(-2, 1)$
 $B'(3, 6) \rightarrow B''(-3, 6) \rightarrow B'''(-2, 4)$
 $C'(9, 6) \rightarrow C''(-9, 6) \rightarrow C'''(-8, 4)$

$A'(6, 2) \rightarrow A''(3, 1)$
 $B'(6, 4) \rightarrow B''(3, 2)$
 $C'(18, 4) \rightarrow C''(9, 2)$

Dilation, reflection across y-axis, translation. horizontal stretch,

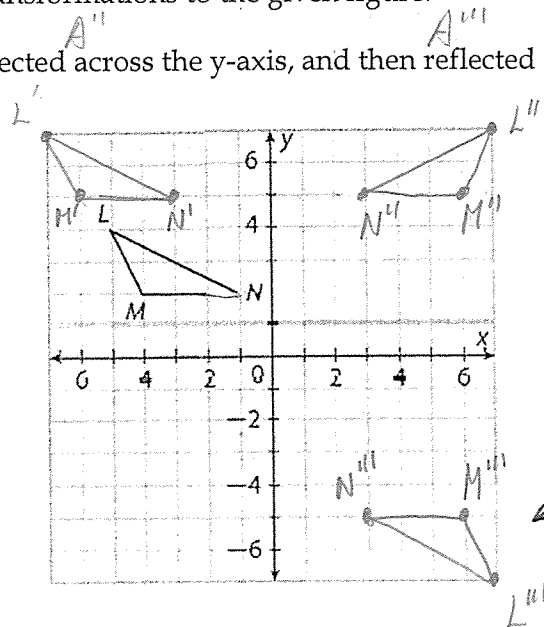
*Lesson 2
See next page*

5. Predict the result of applying the sequence of transformations to the given figure.

a) $\triangle LMN$ is translated along the vector $\langle -2, 3 \rangle$, reflected across the y-axis, and then reflected across the x-axis.

$L(-5, 4) \rightarrow L'(-7, 7) \rightarrow L''(7, 7)$
 $M(-4, 2) \rightarrow M'(-6, 5) \rightarrow M''(6, 5)$
 $N(-1, 2) \rightarrow N'(-3, 5) \rightarrow N''(3, 5)$

$\rightarrow L'''(7, -7)$
 $\rightarrow M'''(6, -5)$
 $\rightarrow N'''(3, -5)$



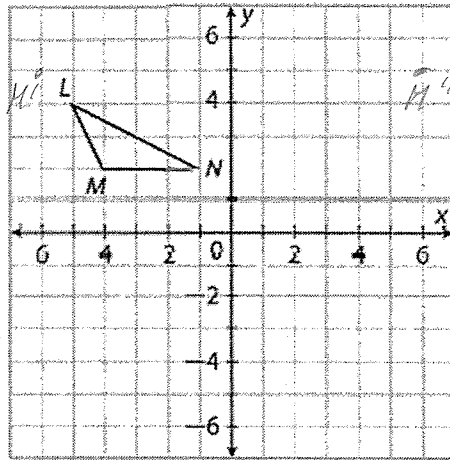
Goal: To be able to visualize the mapping of transformations & make prediction about outcome.

Lesson 2: Making predictions - Predicting the Effect of Transformations

Predict the result of applying the sequence of transformations to the given figure.

5a) $\triangle LMN$ is translated along the vector $\langle -2, 3 \rangle$, reflected across the y-axis, and then reflected across the x-axis.

1st transformation, $\triangle LMN$ will shift further up and left in quadrant II. 2nd transformation, after the reflection, it will be in quadrant I. Its orientation will be changed.



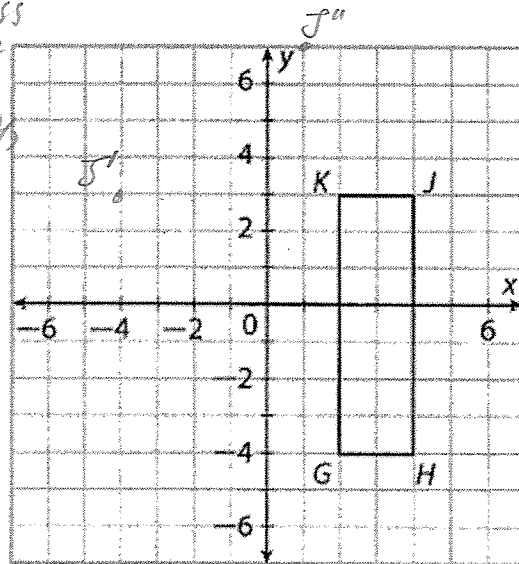
$\triangle LMN$. It will be in quadrant IV. It has been rotated 180° about the origin. It is further away from the axes than the preimage.

3rd transformation: A reflection across x-axis will change its orientation and will be moved to Quadrant IV. These 2 reflections produce the same result as a rotation of 180° about the origin.

The final outcome will be a \triangle with same shape & size as

5b) Rectangle GHIJK is reflected across the y-axis, and translated along Vector $\langle 5, -4 \rangle$.

1st transformation: A reflection across the y-axis will move it to Quadrant II. Since a rectangle has symmetry, it will appear to have been translated 6 units left.



2nd transformation: A translation will move it into Quadrant I.

The final result will be a rectangle with the same shape and size as GHIJK. It will sit on the x-axis in Quadrant I, closer to the y-axis than the preimage.

Geometry Honors
Chapter 2 Day 4

Name: _____

Date: _____

H.W: Page: Page 108 #s 1, 2, 4, 5-19, 20, 21, Add graph paper to your supplies at home !