Composition of Transformations

All the transformations we have done so far can be called **isometries** or **rigid motions.**

a. An **isometry** is a ____________ where the pre-image and the __________ are **congruent**. When we perform the transformation, all the side lengths and angles stay the same length and measure. Its just the location and orientation of the figure that has changed. **Rigid Motion** is a ____________ for isometry.

Our three isometries are _____________, _____________, and _____________.

Compositions of Transformations: a combination of transformations that happens when we apply multiple transformations to the same figure.

Example 1:

Recall, what's the rule for reflect over x-axis?

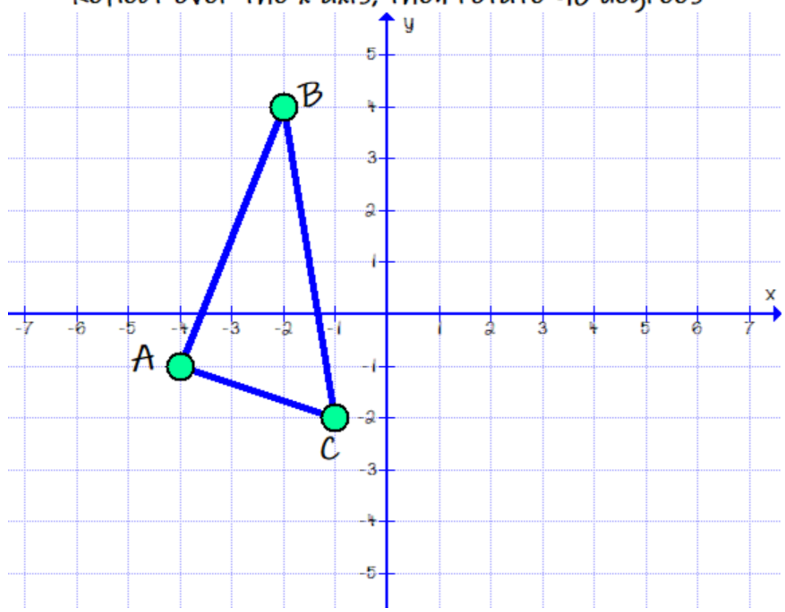
Recall? What's the rule for rotating 90 degrees?

A (,   ) → A' _______ → A'' ________

B (,   ) → B' _______ → B'' ________

C (,   ) → C' _______ → C'' ________

Reflect over the x-axis, then rotate 90 degrees



Identify the single reflection that could have produced this combination in one step.

Reflection over _________________.

Example 2:

A(,   )→A'_________ → A''__________

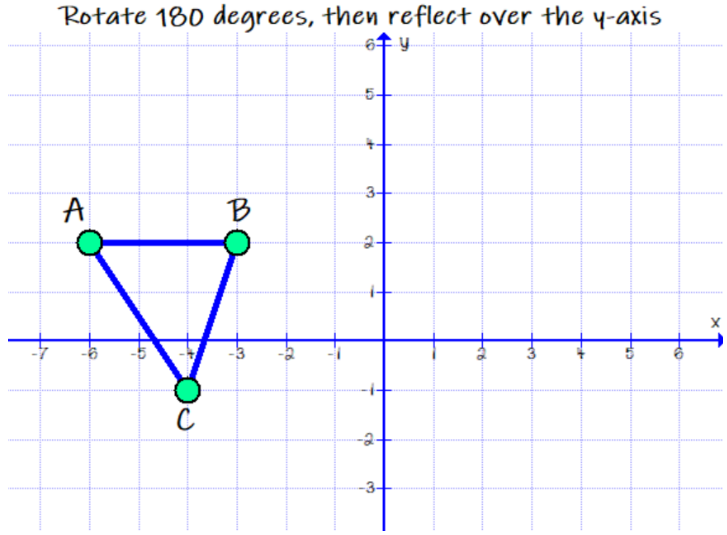
B(,   )→B'_________ → B''__________

C(,   )→C'_________ → C''__________

- What one transformation could have produced this combination in one step?

  ____

Rotate 180 degrees, then reflect over the y-axis



Another notation: For Compositions, there is a special type of notation that tells us how to work a problem.

Example 3:

a. $T_{x,y}$ denotes a ____________. The ______ value tells you to go right when it's ___________ and left when it's ______________. The ______ value tells you to go ___ when it's positive, and ______ when it's negative.

b. R_{θ} denotes a ____________. There will be a 90, 270, or 180 instead of the θ. The default direction for a rotation is always _______________.

c. r_{line} denotes a ___________. The line of reflection will be give where you see the word "line". We often reflect over the following lines: _______________, ______________, ____________, _______________, __________________, __________________.

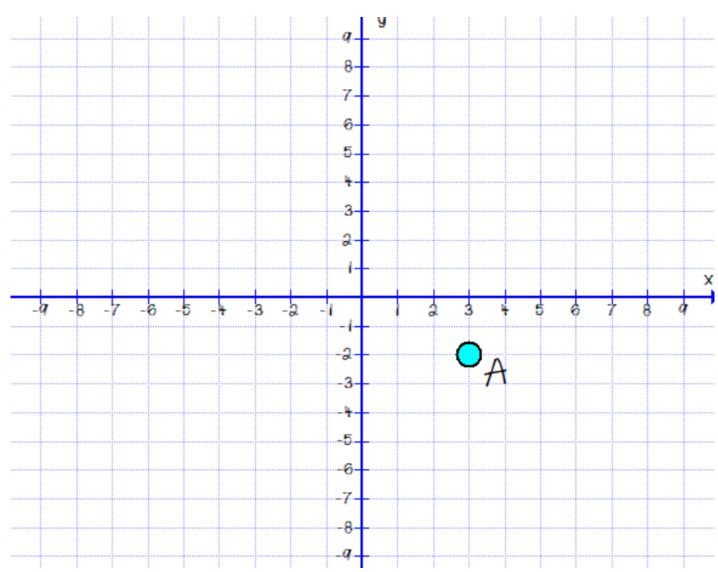
d. When working in composition notation we have to work from _________to __________, which is the opposite of what we are used to!

Example 4:

What is the image of the point A(3, -2) under the transformation $R_{90^\circ} \circ T_{-4,3}$?

- Step 1: Work from Right to left! So first we will _________________ the point, and then we will ______________ it.

A (3,-2) will be moved ______ to the left, and ______ up. To become A' __________.



- Step 2: Now we will ______ the point ________ degrees **counterclockwise,** using the rule (x,y)→________

A' __________ becomes A'' ______________.

Remember we work **right to left** in this notation only!