

- 4.2.8 B.1** Understand and apply transformations including sequence of transformations needed to map one figure onto another.
- 4.2.8 C.1** Use coordinates in four quadrants to represent geometric concepts.
- 4.2.8 C.2** Use a coordinate grid to model and quantify transformations.
- 4.5.8 D.2** Use reasoning to support their mathematical conclusions and problem solutions.

It is possible to apply more than one transformation to a figure.

For example, a figure could be translated 2 units right and then reflected over the x -axis.

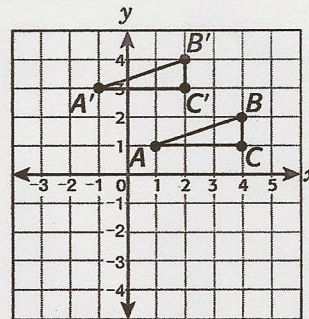
Lee plots triangle ABC in quadrant I. She translates the triangle up 2 units and left 2, then down 5 units and right 1. How else could Lee have translated triangle ABC to create triangle $A''B''C''$?

Draw the triangle and the translations described in the problem. Then analyze the coordinates of the preimage with the coordinates of the image.

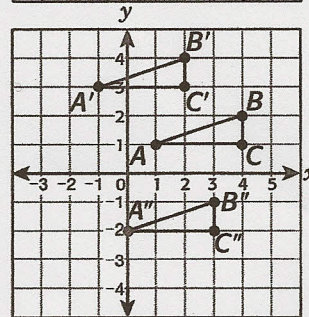
NJ ASK Tip

Geometry There may be several different ways to create an image using one or more transformations.

Step 1 Translate triangle ABC up 2 units and left 2 units. Name the image triangle $A'B'C'$.



Step 2 Translate triangle $A'B'C'$, down 5 units and right 1 unit. Name the image triangle $A''B''C''$.



Step 3 Write the coordinates for the triangle ABC and triangle $A''B''C''$.

$A(1, 1)$	$B(4, 2)$	$C(4, 1)$
$A''(0, -2)$	$B''(3, -1)$	$C''(3, -2)$

Step 4 Compare the coordinates.

The x -coordinates are decreasing by 1, and the y -coordinates are decreasing by 3. This is the same as a translation of 1 left, and 3 down.

Lee could have translated the triangle left 1 unit and down 3 units.