Lesson 7.3: Compositions of Transformations

In this lesson you will:

- find the single transformation equivalent to the composition of two translations
- define glide reflection

When you apply a transformation to a figure and then apply another transformation to its image, the resulting transformation is called a **composition** of transformations.

•Example 1: Triangle ABC with vertices A(-1,0), B(4,0), and C(2,6) is first translated by the rule $(x,y)\rightarrow(x-6, y-5)$ to give the image $\Delta A'B'C'$, and then $\Delta A'B'C'$ is translated by the rule $(x,y)\rightarrow(x+14, y+3)$ to give the image $\Delta A''B''C''$.

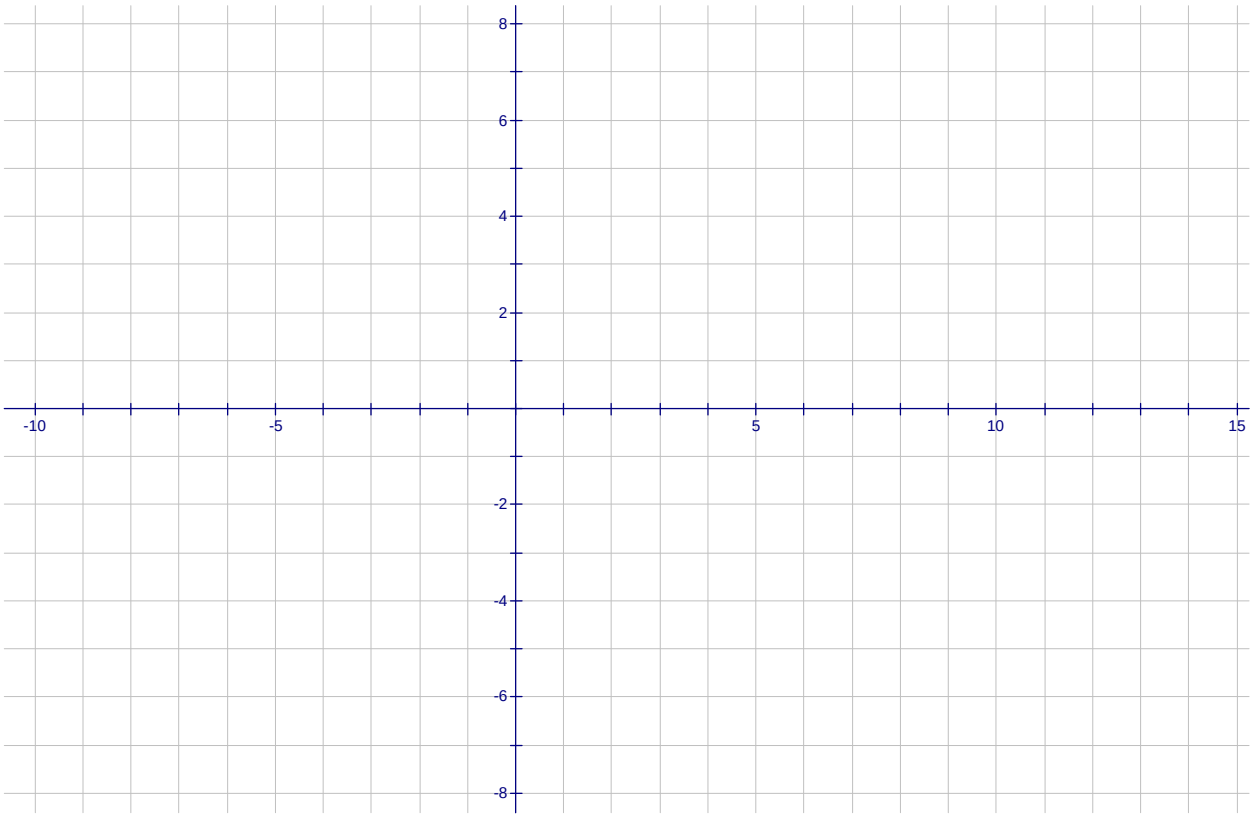
a.) Give the coordinates of $\Delta A'B'C'$: A'(___,___), B'(___,___), C'(___,___)

b.) Give the coordinates of $\Delta A''B''C''$: A''(___,___), B''(___,___), C''(___,___)

c.) Draw ΔABC, $\Delta A'B'C'$, and $\Delta A''B''C''$ on the grid below.

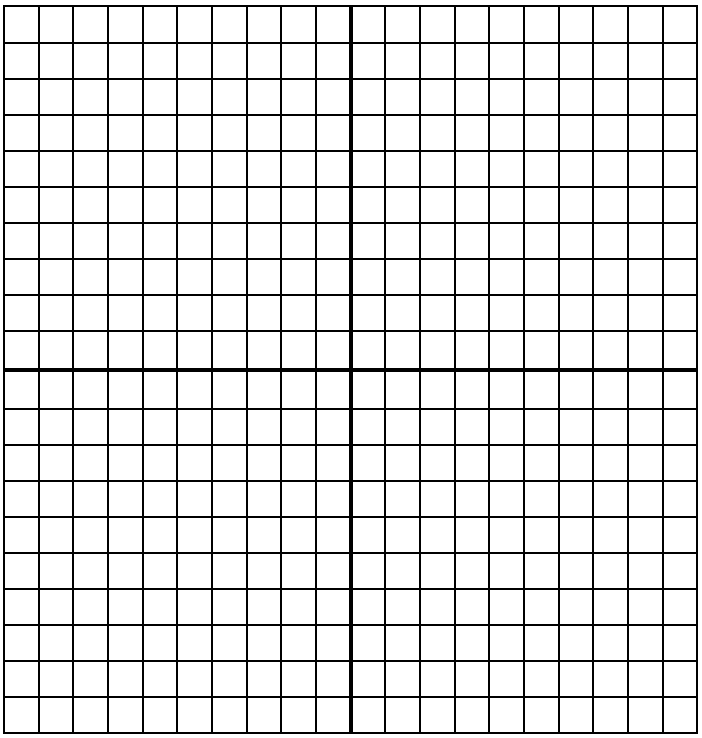
d.) What single translation is equivalent to the composition of these two translations?

(x,y) →(_____, _____)



•Example 2

a.) On the grid below, draw ΔABC: A(3,6), B(9,3), and C(6,-3)



b.) Suppose ΔABC is reflected across the y-axis. Fill in the coordinates for ΔA'B'C' and sketch it in a different color than Δ ABC.

A'(___,___), B'(___,___), C'(___,___)

The rule for this transformation is:

$(x,y) \rightarrow (\quad , \quad)$.

c.) Now translate the image ΔA'B'C' 5 units to the right and 6 units down. What are the new coordinates of this triangle, ΔA''B''C''? Fill in the coordinates and sketch it in a different color.

A''(___,___), B''(___,___), C''(___,___)

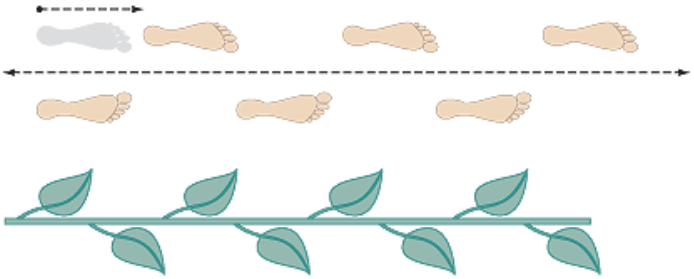
The rule for this transformation is:

$(x,y) \rightarrow (\quad , \quad)$.

d.) What one rule would transform ΔABC to ΔA''B''C'' (the composition)?

(x,y) →(_____, _____)

There are many other ways to combine transformations. Combining a translation with a reflection gives a special two-step transformation called glide reflection. A sequence of footsteps is a common example of glide reflection. *Add "glide reflection" to your vocabulary list.



⇒**ASSIGNMENT**: _____