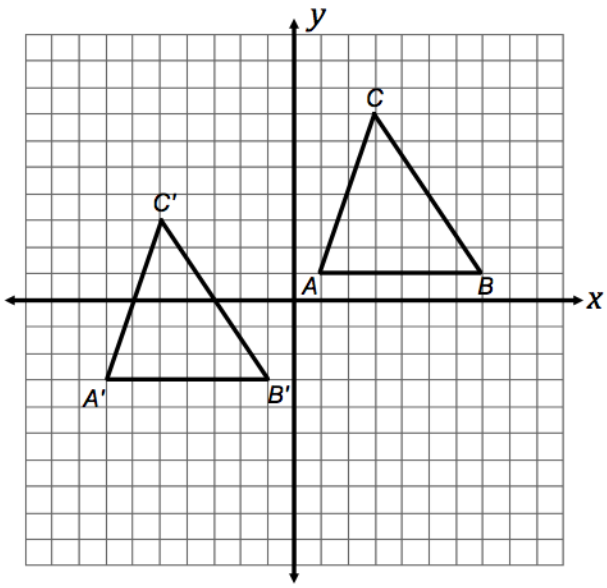
Geometry CC 1.17 Translations

Opening Exercise

Another type of rigid motion is called a *translation*, or slide, in which every point of a figure is moved the same distance in the same direction.



Describe how to translate ΔABC to its image $\Delta A'B'C'$.

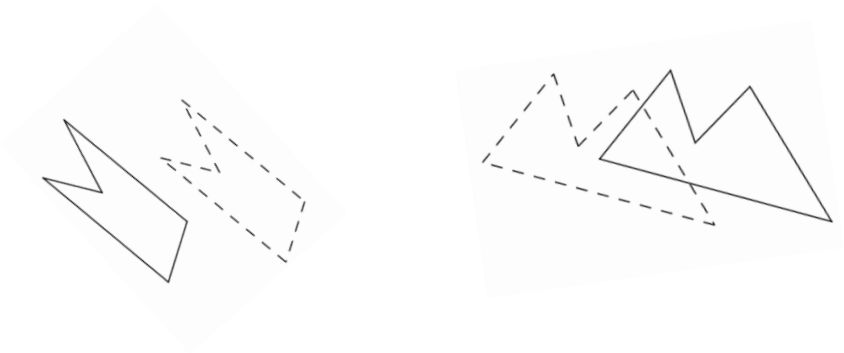
This translation can be represented using two different types of notation:

$(x, y) \rightarrow (x - 8, y - 4)$ *or* $T_{-8,-4}$

Using rays, connect the pre-image points with the image points - $\overrightarrow{AA'}$, $\overrightarrow{BB'}$, and $\overrightarrow{CC'}$. What do you notice about the rays you have drawn?

This ray is called a **vector**. A vector is a directed line segment that has both length (magnitude) and direction.

Draw a vector that defines each translation below.



Exercises

1. Determine the coordinates of the image of the point (5, -3) under $T_{-2,-1}$.

2. Determine the coordinates of the image of the point (-8, -3) under the translation $(x, y) \rightarrow (x + 4, y - 1)$

3. Determine the translation that maps the point (-5, 5) to the point (7, 1).

4. A translation maps the point (-2, 5) to the point (-4, -4). What is the image of (1,4) under the same translation?

5. Determine the coordinates of the image of the point (2, -3) under the translation $(x,y)\rightarrow(x-4,y+2)$

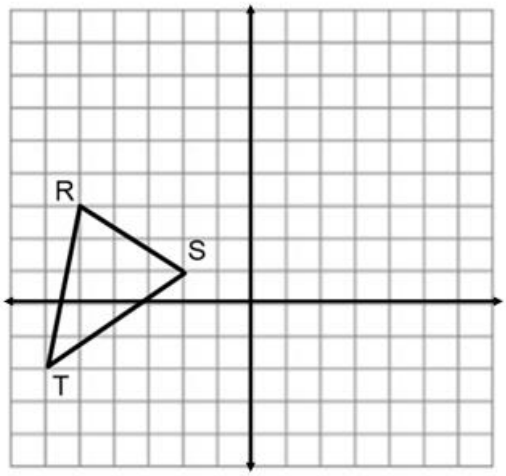
6. If translation $T_{x,y}$ maps point P (-3, 1) on to point P' (5, 5), find x and y.

7. Determine the coordinates of the image of the point (-2, 2) under $T_{-2,6}$.

8. A translation maps the point (3, 1) to the point (-4, 2). What is the image of (4,-1) under the same translation?

9. a. On the same set of axes, graph and state the coordinates of $\Delta R'S'T'$, the image of ΔRST after a translation of two units down and six units right. R':_____ S':_____ T':_____
   b. Draw the vector that defines the translation.
   c. Symbolically state the translation mapping ΔRST onto $\Delta R'S'T'$

   $T_{?,?}$:_____ $(x, y)\rightarrow(?, ?)$_____



10. DABC has vertices A (1, 1), B (2, 3) and C (6, -2).

   a. Graph DABC

   b. Graph D$A'B'C'$, the image of DABC after the translation $(x,y)\rightarrow(x-2,y-6)$

   c. Draw the vector that defines the translation.

   d. Graph, $\Delta A''B''C''$ the image of D$A'B'C'$ after a reflection in the y-axis.