GEOMETRY: UNIT 1: TRANSFORMATIONS

Translations

WARMUP

- Watch the following video:

http://www.pbslearningmedia.org/resource/muen-math-g-translation/translation/

TRANSLATIONS

- **Objective**: Students will be able to do the following, regarding geometric transformations.
  - Write Transformations Symbolically and justify their choice.
  - Explain the movement of points for a given transformation.
  - Draw an image under each transformation.

ISOMETRY: A REMINDER

- An Isometric Transformation has the following properties are preserved:
  - Distance (All lengths stay the same)
  - Angle measure (All angles stay the same)
  - Parallelism (All lines that are parallel stay parallel)
  - Collinearity (All points on a line remain on a line)

- In short, the transformed figure (**Image**) is the same shape and size as the original figure **(Pre-Image).**

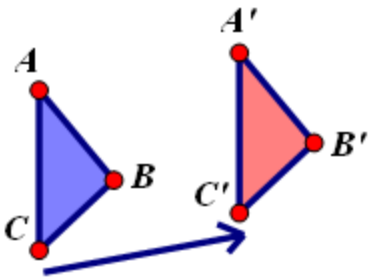
TRANSLATIONS

- A transformation that glides all points of the plane the same distance in the same direction is called a **translation.**

- When working on the coordinate plane, a vector is used to describe the fixed distance and the given direction often denoted by **<x,y>.** The x value describes the effect on the x coordinates (right or left) and the y value describes the effect on the y coordinates (up or down).

The pre-image and image have the same shape and size.

$$T_{\langle x,y\rangle}(\Delta ABC) = \Delta A'B'C'$$



TRANSLATIONS

- If a translation maps *A* to *A'*, *B* to *B'*, and *C* to *C'*, Points A, B, and C glide along parallel or collinear segments and $AA' = BB' = CC'$.

The pre-image and image have the same shape and size.

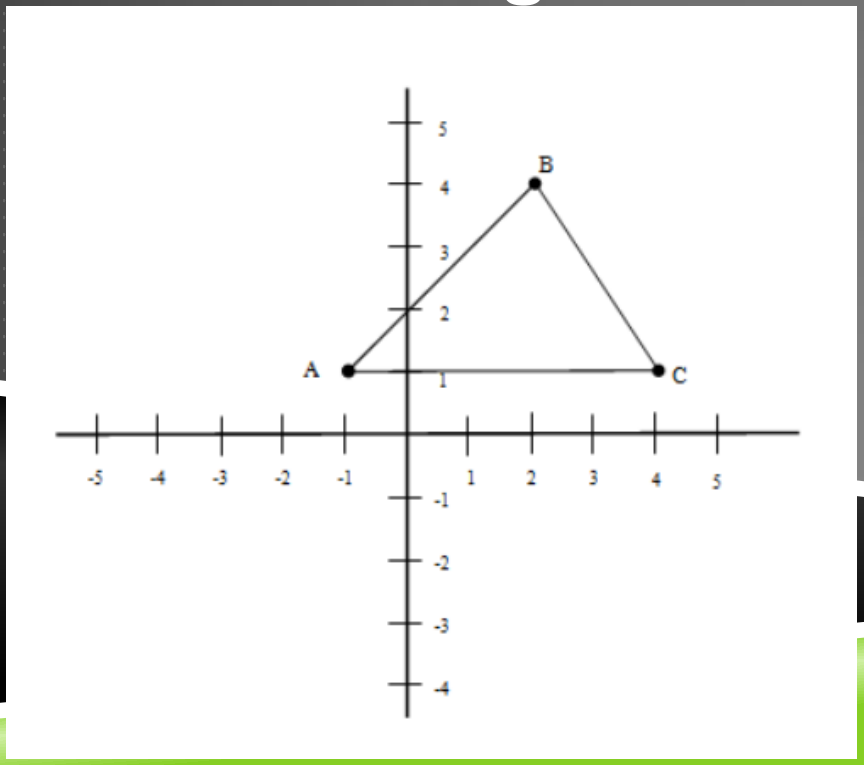
$$T_{\langle x,y \rangle}(\Delta ABC) = \Delta A'B'C'$$

TRANSLATION EXAMPLE

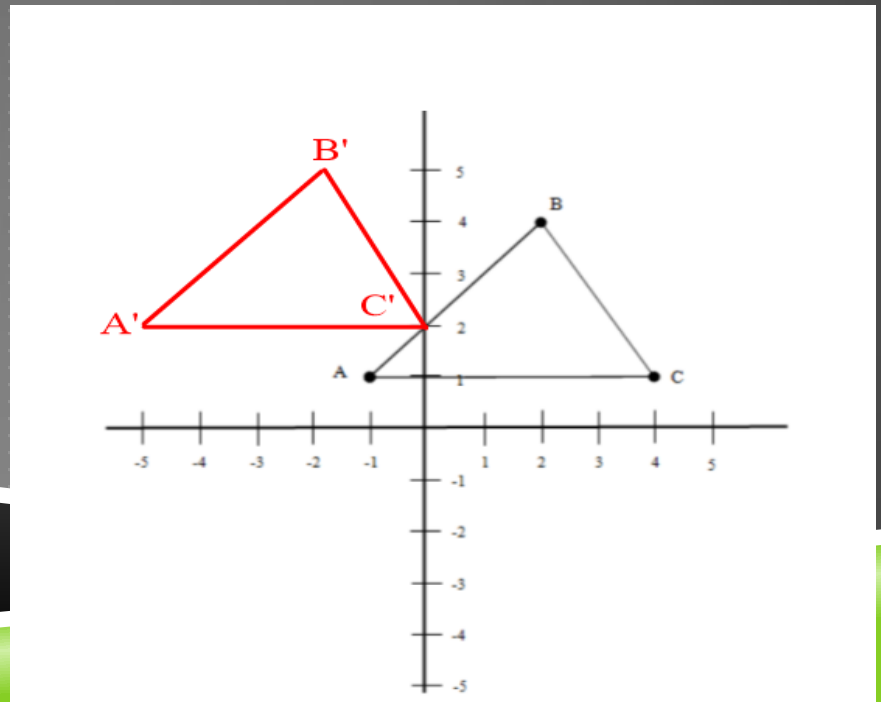
Given ΔABC with *A(-1,1), B(2,4), C(4,1)*, **translate** $\Delta \boldsymbol{ABC}$ left 4 units and up 1 unit.

Notation: $T_{<x-4,y+1>}\Delta ABC$

Pre-Image



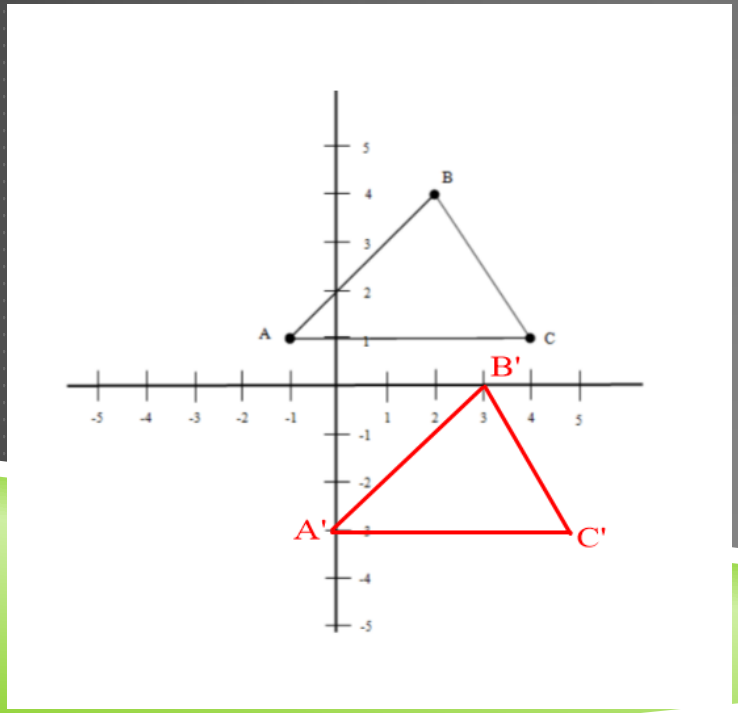
Image



TRANSLATION EXAMPLE 2

Given the pre-image ΔABC with A(-1,1), B(2,4), C(4,1), along with it image $\Delta A'B'C'$ with the points on the graph, the translation by filling in the notation.

Image



Notation: $T_{<x-\_,y+\_>}\Delta ABC$

Notation: $T_{<x+1,y-4>}\Delta ABC$

TRANSLATION: FROM PRE-IMAGE TO IMAGE, AND VICE VERSA

- Given the translation $T: (x, y) \rightarrow (x + 4, y + 2)$, give the Image if a Pre-image is given, or a pre-image if the image is given.

- Given – Pre-Image: (-4,-4) → Image: (____,____)

  (0,-2)

- Given – Image: (6,0) → Pre-Image: (____,____)

  (2,-2)

- Given – Image: (0,5) → Pre-Image: (____,____)

  (-4,3)

CLASSROOM ACTIVITY

- Go to page 585 of your textbook.
- Work through problems 1-7 of the "Classroom Exercises" section with your group.
- When you are done, explain in your own words what a translation does to a point. Be brief, but not lazy (i.e. Don't say "It moves it").