**Activity 1.2.1 Understanding Vectors**

1. Draw $Δ ABC$ on the graph below by placing points on the coordinate with coordinates *A* (1, 1), *B* (5, 1), and *C* (2, 4).
2. Now create a new triangle $ΔA^{'}B^{'}C^{'}$ on the same grid by moving each vertex up 4 units and to the right 2 units.
3. Determine the *run* and *rise:*

From *A* to *A’: run* = *rise* =

From *B*  to *B’: run = rise =*

From *C* to *C’: run* = *rise* =

d. Recall that $slope=\frac{rise}{run.}$ What do you notice about the slopes of lines $\overleftrightarrow{AA’,}$ $\overleftrightarrow{BB’}$ and $\overleftrightarrow{CC’}$?

1. Determine the *distances* from *A* to *A*’, *B* to *B*’ and *C* to *C*’.

*AA*’ =

*BB*’ =

*CC*’ =

What do you notice about the distances?

1. Based on your observations, comment on the side lengths, angles and overall shape between $Δ ABC$ and $ΔA^{'}B^{'}C^{'}$.

**Notes**: While slope is a ratio of the rise to the run, we can also create the **vector [*run*, *rise*].** A **vector** is a quantity that has **magnitude (length)** and **direction**.

A **vector** is represented by a **directed line segment** with an arrow at one end indicating the direction of movement. Unlike a ray, a **directed line segment** has a specific length.

The **direction** is indicated by an arrow pointing from the tail (the initial point) to the head (the terminal point). If the tail is at point A and the head is at point B, the **direction** of the vector from A to B is written as:

 

Steps 1 and 2 of the activity represent a **translation**. $ΔA^{'}B^{'}C^{'}$is a translation of $Δ ABC.$ Every translation is identified by a **vector** that explains what in direction and how far to the object moves. The **magnitude** **(or size)** of a vector is found using the distance formula to determine the distance between the tail and the head. The **direction** of a **vector** is determined by the angle it makes with a horizontal line.

2. Based on your observations in steps a-e in question 1 where $ΔA^{'}B^{'}C^{'}$is a translation of $Δ ABC$,

1. Use run and rise to write the vector for this translation.
2. What is the magnitude of the vector?
3. Describe the direction of the vector
4. A vector [-2,-3] starts at (5,6).
	1. What is the endpoint of this vector?
	2. What is the magnitude of this vector?