**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*, *rise* between AA’, BB’ and CC’.

**AA’**- *run* = *rise* =

**BB’**- *run = rise =*

**CC’**- *run* = *rise* =

**What do you notice about the slopes of lines *AA*’, *BB*’ and *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.

6. Based on your observations in steps 1-5 of the activity 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

7. What would the magnitude be for a vector [-2,-3] that starts at (5,6).