

INVESTIGATION WEEK 3

In preparation for the presentation of your assignment, this week you are to complete the following VECTOR tutorials for Geogebra

Geogebra is a free download from www.Geogebra.org for your own home pc, you can also choose to run it from a browser and not install anything on your machine, or it is already preloaded onto all the maths computers, (look in the maths folder on the desktop).

PART 1

Open GeoGebra and select the Algebra & Graphics view from the View menu. (They should both be on)

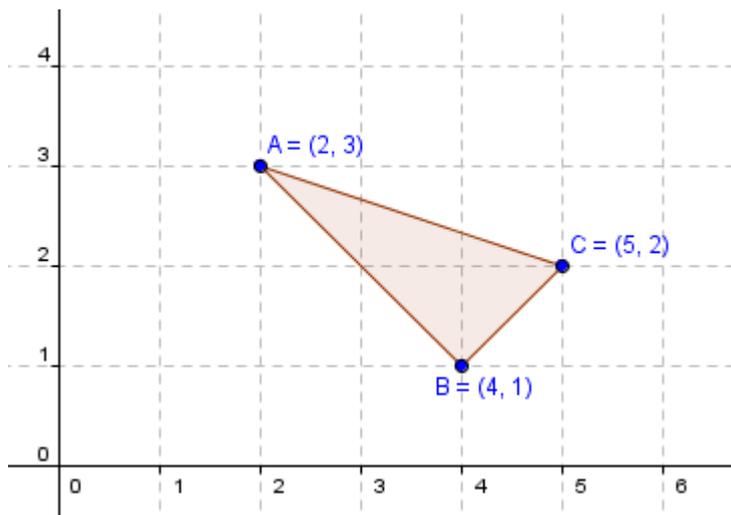
Right click on the plane and choose grid to turn it on.

Click the **New Point** tool and place the points on the coordinates given: A on (2,3), B on (4,1) and C on (5,2).

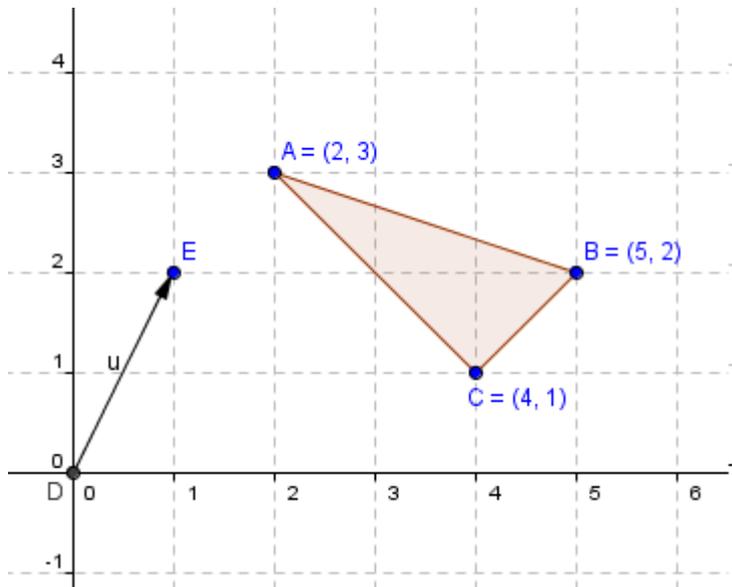
Next, we draw triangle ABC using the Polygon tool. To do this, click the **Polygon** tool and click the points in the following order: point A, point B, point C and point A again to close the polygon.

To display the label and the coordinates of the points, right click the points then click **Object Properties** to display the Preferences dialog box.

In the *Basic* tab of the *Preferences* dialog box, check the *Show label* check box, and choose the *Name & Value* option in the drop-down list box, and then close the window. Your drawing should look like the figure below.



The only remaining part of the construction is the vector tool. To construct vector DE , select the **Vector between Two Points** tool, (this can be found in the “line through two points menu”) click the origin and click the coordinate $(1,2)$. After this step, your drawing should look like the one shown in here.



To translate the object using the vector, select the **Translate Object by Vector** tool, (in the “reflect object in line menu”) click the triangle and then click the vector. Notice that a translated triangle appears after clicking the vector tool.

QUESTION 1

What can you say about the preimage of the triangle object and the translated object?

If the coordinates of the vertices of the translated triangle is not displayed, display it using the steps we have done in step 5 and 6.

QUESTION 2

What do you observe about the relationship of the coordinates of the points of the original triangle and the translated triangle?

QUESTION 3

Move the terminal point (point E) of the vector. Does your observation in (11) still hold?

PART 2

On a new Geogebra sheet.

Create points at $A=(3,1)$, $B=(7,2)$, $C=(9,-2)$ and $D=(2,-4)$

Create vectors OA , OB , OC and OD (these will get automatically named, u,v,w,z)

Type into the input bar $u+v$

QUESTION 4

What happens when you type $u+v$ in the input bar? What does this represent?

Observe now what happens when you drag points A and B around the screen (make sure you select the Arrow (top left icon) to drag the point).

QUESTION 5

What happens when you type $v-u$ in the input bar? What does this represent?

Choose **Vector from point** (in the same menu as vector through two points). First click the point A , then click the vector you created for $v-u$.

QUESTION 6

What happens now?

Note – you can turn on and off vectors you don't want to see by clicking the "dot" in the algebra window.

QUESTION 7

Final task – your challenge is now to work out how to get the vector that starts at A and passes through B and is continued the same distance again. Effectively you are going to end up with the vector $2AB$, that has initial point at A, but it will be connected so that when you move A or B around the screen this vector changes. (hint, use the tools we have just used, hide the workings and display just the result).

Bring this file you have created to me to see and get marked off.

If you want to play with more tutorials – try these

<http://mathandmultimedia.com/2011/01/01/geogebra-essentials-series/>

<http://mathandmultimedia.com/2010/12/03/geogebra-basic-geometric-construction-series/>

<http://mathandmultimedia.com/2010/12/01/geogebra-intermediate-tutorial-series/>