## **Dilations** (Using Geometer's Sketchpad 4.0)

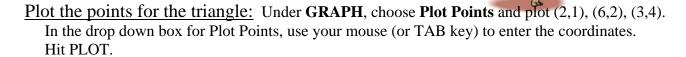
Discover what happens when you dilate a triangle.

Open software and set up: Open Geometer's Sketchpad 4.0.



Expand the screen to full screen view. On the left vertical toolbar, be sure that the arrow is clicked. Under **DISPLAY**, choose **Show Text Palette**.

Set the graph grid: Under GRAPH, choose Grid Form, Square Grid.



Complete the triangle: To draw the triangle, highlight (by clicking on) the three points. Choose CONSTRUCT, Segments. If you would like to label your triangle vertices, choose the A from the left vertical toolbar, and click on each point.

Highlight the three vertices only of the triangle. Choose CONSTRUCT, Interior. Adjust your color by right clicking in the triangle interior and choosing a new color.

<u>Measure the coordinates:</u> Highlight one point. Be sure only the point is highlighted. Under **MEASURE**, choose **Coordinates**. This will place the coordinates on the screen. Repeat this process for each of the points.

<u>Mark the point of dilation:</u> Highlight the origin. Under **TRANSFORM**, choose **Mark center**. We are getting ready to dilate the triangle about the origin.

<u>Dilate the figure:</u> You will need to select the triangle by drawing a marquee around the figure.

With your arrow clicked, use your mouse to click a starting corner to draw a box (marquee) around the triangle. The triangle will become highlighted. Under **TRANSFORM**, choose **Dilate** and enter <sup>1</sup>/<sub>4</sub>.

Now investigate:

1. Measure the coordinates of the image triangle. What do you notice?\_\_\_\_\_

Generalize your hypothesis into a rule that will illustrate the changes in the coordinates:

Dilate:  $D_k(x, y) \rightarrow ($ ,

2.	Highlight one side of the original triangle. Choose MEASURE, Length. Record this length.
	Highlight the corresponding side in the image triangle. MEASURE, Length. Record this length.
	Do the sides of a triangle maintain their lengths through a dilation with a scale factor between 0 and 1?
3.	Describe what happens to the original triangle when the dilation scale factor is between 0 and 1:
4.	Choose an angle in the original triangle by highlighting three vertices in order. Choose MEASURE, Angle. Record this measurement.  Highlight the appropriate angle in the image triangle. MEASURE. Angle. Record this
	Highlight the corresponding angle in the image triangle. MEASURE, Angle. Record this measurement  Do the angles of a triangle maintain their measurements through a dilation?
5.	Delete everything except the original triangle. Choose a scale factor of 2 and dilate the triangle. Highlight one side of the original triangle. Choose MEASURE, Length. Record this length. Highlight the corresponding side in the image triangle. MEASURE, Length. Record this length.
	Do the sides of a triangle maintain their lengths through a dilation with a scale factor greater than one?
6.	Describe what happens to the original triangle when the dilation scale factor is greater than 1:
7.	Delete everything except the original triangle. Choose a scale factor of -1.5 (enter as -3/2) and dilate the triangle.  Describe what happens to a triangle when the dilation scale factor is negative:

