**Dual Transformations** 1/10/17 **Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour \_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_**

**PART 1:**

**1) Choose a shape** which is composed of straight line segments connecting anywhere from 3 to 5 points. Do not make a symmetrical shape, since you will not be able to tell if it has been flipped over or rotated. (An F or L is good.) Sketch the shape to the right.

**2) Plot the shape, which is the preimage, on the grid below** in any quadrant you like.

**3) Describe precisely the two transformations you would like to do to the shape, and write the mathematical functions which will accomplish each transformation.**

 *example*: “Dilate by scale factor of 2, then reflect across line y = −x.”

 Rule: P( x , y ) = ( 2x , 2y ) Q( x , y ) = ( −y , −x )

 **Transformations: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Rules: P (x , y ) = ( , ) then Q (x , y ) = ( , )**

**4) List the original coordinates from the preimage on the grid below, and use Rule P to calculate the transformed coordinates of the image. Then use the coordinates of the Image, and use Rule Q on those.**

 Original Points (Preimage) Image (1st transform) Second Image (2nd transform)

 A ( , ) A’ ( , ) A” ( , )

 B ( , ) B’ ( , ) B” ( , )

 C ( , ) C’ ( , ) C” ( , )

 D ( , ) D’ ( , ) D” ( , )

 E ( , ) E’ ( , ) E” ( , )

**Plot the points of the image and 2nd image, and make sure they are where you predicted, and similar to the first image. Label all points correctly with A, A’, A”, etc.**

**Part 2: Repeat all the previous steps, but choose a different original shape, and two different transformations. Try a dilation or make up your own transformation. Use a different scale if you need to, if your coordinates come out to be larger than 10.**

**Describe precisely the two transformations, and write the mathematical functions which will accomplish each transformation.**

**Transformations: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Rules: P (x , y ) = ( , ) then Q (x , y ) = ( , )**

**List the original coordinates (up to five points), and then the transformed coordinates of the images.**

 Original Points (Preimage) Image (1st transform) Second Image (2nd transform)

 A ( , ) A’ ( , ) A” ( , )

 B ( , ) B’ ( , ) B” ( , )

 C ( , ) C’ ( , ) C” ( , )

 D ( , ) D’ ( , ) D” ( , )

 E ( , ) E’ ( , ) E” ( , )

 F ( , ) F’ ( , ) F” ( , )

**Plot the points of the image and 2nd image, and make sure they are where you predicted, and similar to the first image. Label all points correctly with A, A’, A”, etc.**