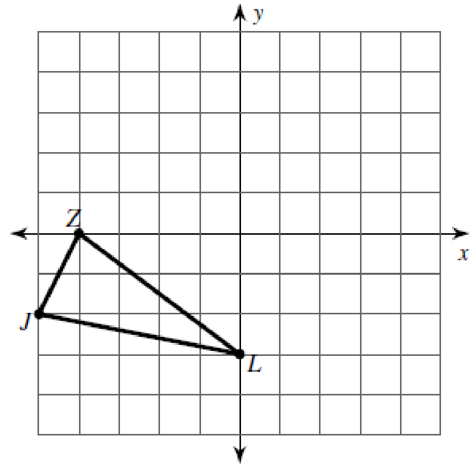
The Graphing Method:

Reflections in the: ○ x-axis ○ y-axis ○ y = x ○ y = –x	1. Graph/highlight the line of reflection 2. Count the boxes towards your line of reflection 3. Count the same amount of boxes on the other side 4. Plot your point **Note:** if the line is y = x or y = – x then count diagonally.
Rotations around the origin: ○ 90 (1/4 turn, paper is horizontal) ○ 180 (upside down) ○ 270 (3/4 turn, paper is horizontal)	1. Plot your original points (if no graph provided) 2. Turn your paper the required amount Counterclockwise: top corner to the left Clockwise: top corner to the right 3. Look at the points as though it's a brand new graph and identify the coordinates **Note:** it's best if the graph your using has no coordinate numbers listed because it won't confuse you.
Dilations not centered at (0,0) origin: Center: (a,b) Dilation: k Pre-image point: (x,y) **Formula to find (x',y')** $x' = k(x-a) + a$ $y' = k(y-b) + b$	1. Graph the center of dilation and the pre-image 2. Count the horizontal change and count the vertical change from the center of dilation to your pre-image point 3. Multiply the changes by the scale factor k 4. Start at the center of dilation and count the new horizontal and vertical amount to get to the new point
Rotating around a point other than the origin: Point: P Center: C	1. Plot the center of rotation, C and the point, P. 2. Connect the point to the center of rotation to form CP. 3. Circle the point you are rotating and draw an arrow to the direction you are turning to visualize where your point should end up. 4. Draw a line segment sketch that forms the desired rotation amount (right angle for 90° or a straight line for 180°) *Note: if you need to rotate 270°, go 90° in the other direction* 5. Count the slope of CP (from the point to the center of dilation) 6. Identify the opposite reciprocal slope for CP' if you want a 90° rotation or use the same slope if you want a 180° rotation 7. Start from the center of rotation and count your new slope to get to your new point. 8. Connect your new point P' back to the center to make sure you've formed the desired angle amount in the direction you need (counterclockwise or clockwise).

COMPLETE THIS HANDOUT FULLY.



1) Copy triangle JZL onto a piece of graph paper. Perform each transformation separately onto the pre-image triangle JZL.
   a) Transform JZL according to (x,y) → (x + 5, y – 2). List the new coordinates and graph.
   b) Reflect over the x-axis. List the new coordinates and graph.
   c) Rotate 90° clockwise. List the new coordinates and graph.
   d) Dilate by a scale factor of 1/2 centered at the origin. List the new coordinates and graph.

2) Graph triangle BGX: B(0,3) G(–4,0) X (–4, 2). Perform the sequence of transformations (build each transformation onto the previous answer).
   a) Reflect over the line y = x. List the coordinates and graph.
   b) Rotate 90° counterclockwise. List the coordinates and graph.
   c) Rotate 180° clockwise. List the coordinates and graph.

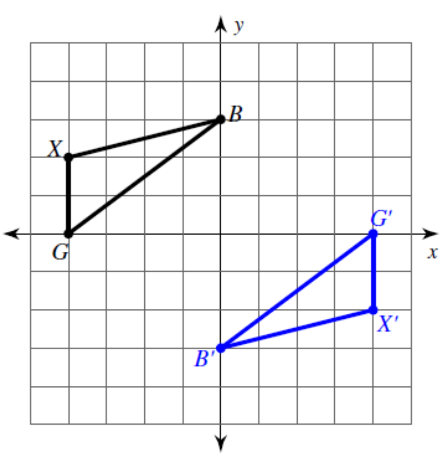
3) P(4,–7) undergoes a translation such that P' has coordinates (5, –4). Fill in the values:
   a) In $T_{h,k}$ for the above translation, what is h and k?
   b) (x,y) → (_______ , _______) fill in the blanks for the algebraic description of the translation.

4) R undergoes the transformation (x,y) → (x + 4, y – 6) where R' has coordinates (–3, 10). What are the coordinates of R? Justify your answer (show your work).

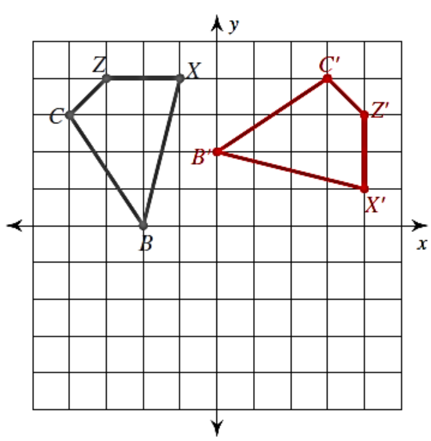
5) Suppose <EFG E(4,5) F(1,3) and G(7,1) is reflected across the y-axis. Graph the image and list the coordinates.

6) What is the line of reflection that maps K(1,-4) J(0,1) M(-4,-2) and C(-3,1) onto K'(1,4) J'(0,-1) M'(-4,2) and C'(-3,-1)?

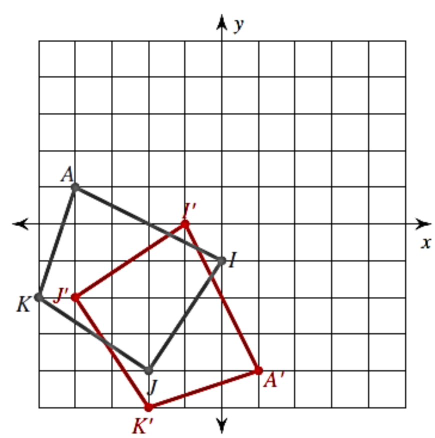
7) Identify the transformation and be as specific as possible.



a)



b)



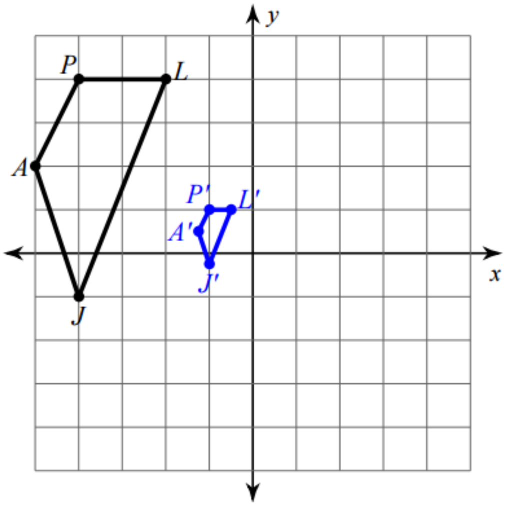
c)

8) Dilate JFN J(–3, 1) F (–2, 3) and N(–2,0) by a scale factor of 2 centered at the origin. Graph and list the coordinates.

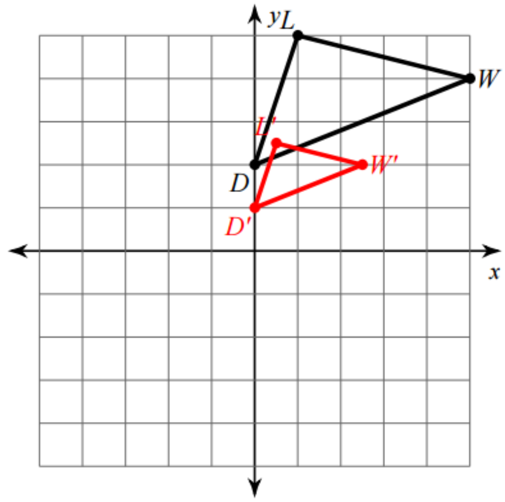
9) Dilate AB with A(–2, –1) and B(0, –4) centered at (2,2) with a scale factor of 1/2. Graph and list the coordinates.

10) Segment RS with R(–9,21) S(12, – 6) was dilated with a center at the origin such that R'(–3, 7) S'(4, –2). What is the scale factor of this dilation? Write the algebraic description to represent this transformation.

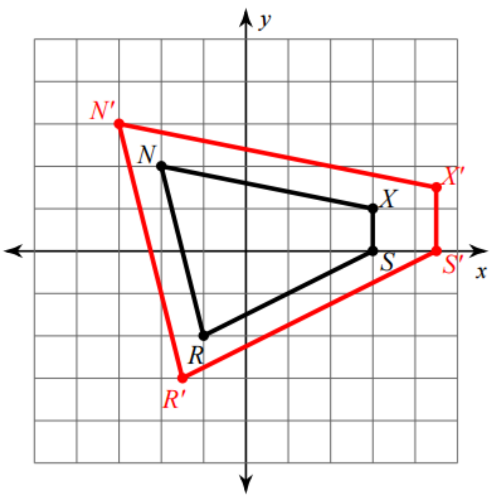
11) Identify the dilation each example below. Include the scale factor and the center of dilation.



a)



b)



c)

d) $K(-1,-2), U(-2,2), V(2,2), Q(2,-1)$

to

$K'(-2,-4), U'(-4,4), V'(4,4), Q'(4,-2)$

12) Identify the 4 transformations and classify them as rigid or non-rigid transformations.

13) AB is the pre-image. Identify the transformations that would transform AB into:

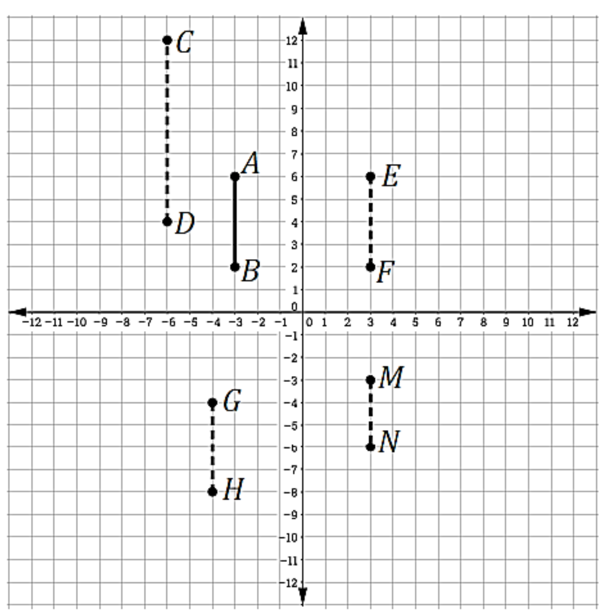
Each transformation can only be used once.

CD: ________________

EF: _________________

GH: ________________

MN: ________________



14) Graph triangle JLZ: J(–5, –2) L(–4,0) and Z(0, –3). Perform each of the following transformations on the pre-image JLZ, graph and list the coordinates of the image.

a) Reflect over the line y = x.

b) Reflect over the x-axis.

c) Reflect over the y-axis.