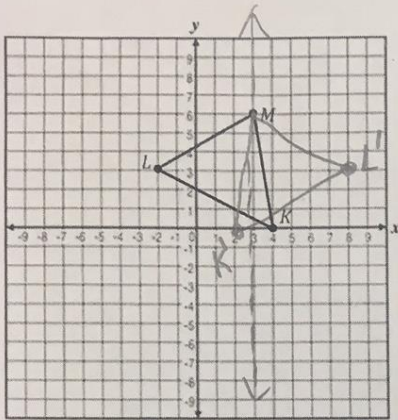


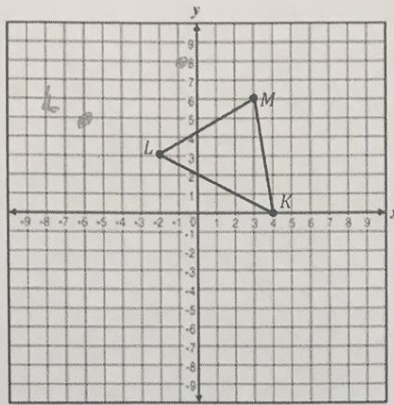
Level 1: Perform each transformation.

1. Reflect $\triangle LMK$ over the line $x = 3$



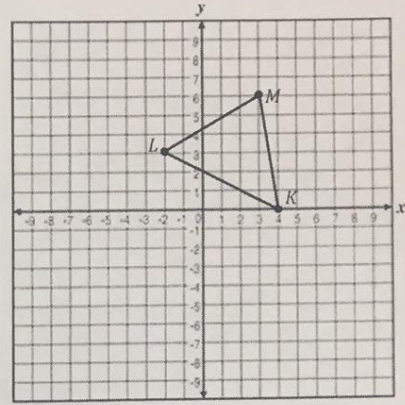
$L': (8, 3)$ $M': (3, 6)$ $K': (2, 0)$

2. Translate $\triangle LMK$ along $\langle -4, 2 \rangle$



$L': (-6, 5)$ $M': (-1, 8)$ $K': (0, 2)$

3. Rotate $\triangle LMK$ 90° CCW about the origin.



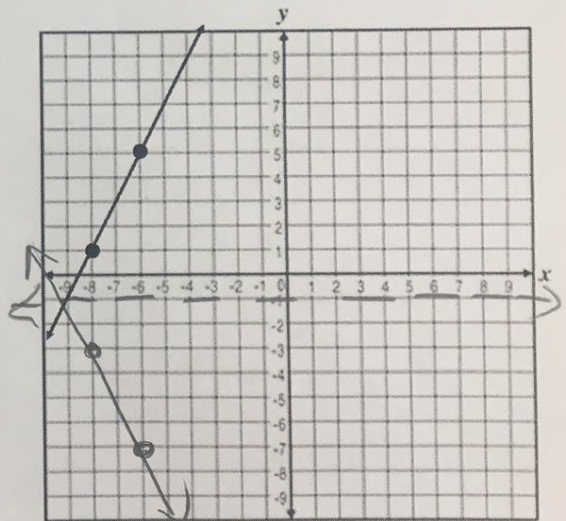
$L': (-3, -2)$ $M': (-6, 3)$ $K': (0, 4)$

4. Which transformation above had an invariant point? reflect in $x=3$ Which point? $M(3, 6)$

Level 2:

1. Write the equation of the line shown in slope-intercept form. (Hint: Use point-slope form first)

$m=2$ $y-1 = 2(x+8)$
 $(-8, 1)$ $y-1 = 2x+16$
 $y = 2x+17$



Get work checked before continuing.

2. Graph the image of the line reflected in the line $y = -1$. (Hint: reflect two points on the pre-image)

$(-8, -3)$
 $(-6, -7)$



Get work checked before continuing.

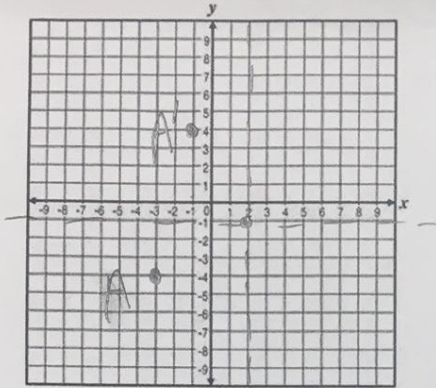
3. Write the equation of the image in slope-intercept form. (Hint: Use point-slope form first)

$m=-2$ $y+3 = -2(x+8)$
 $(-8, -3)$ $y+3 = -2x-16$
 $y = -2x-19$

Fake $A(-5, -3) \rightarrow$ Fake $A'(-3, 5) \rightarrow$ Real $A(-1, 4)$

Level 3: Perform each transformation.

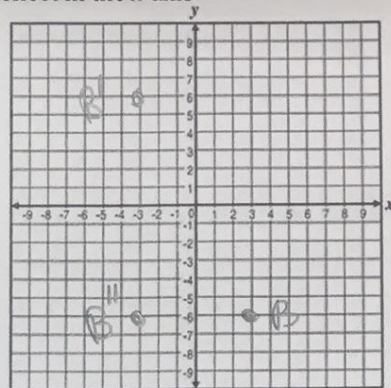
- Find the image of $A(-3, -4)$ rotated 270° CCW about the point $(2, -1)$. $(y, -x)$



$A': (-1, 4)$

- Find the image of $B(3, -6)$ after the composition.

- Rotate 180° CW about $(0, 0)$
- Reflect in the x -axis



$B': (-3, 6)$ $B'': (-3, -6)$

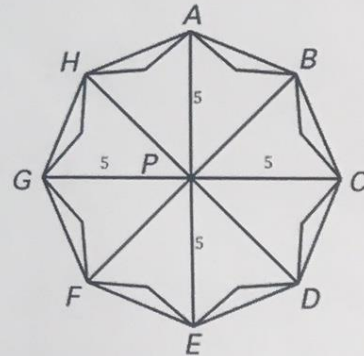
Level 4: Use the figure to the right to complete the following. The center of rotation is point P . Some segment lengths have been labeled.

- Name two possible rotations about the center that will map the figure onto itself. (Hint: Identify the order and magnitude)

Order = 8 $Magn = \frac{360}{8} = 45^\circ$ Ex) 45° CW
 135° CCW

Name the image after each transformation.

- 90° cw rotation of \overline{FG} about P \overline{FA}
- reflection of \overline{HA} over \overline{GC} \overline{FE}
- 180° rotation of \overline{HP} about P \overline{DP}
- 270° ccw rotation of B about P D
- translation of C along $\langle -5, 0 \rangle$ P
- 90° ccw rotation of \overline{HD} about P \overline{FB}



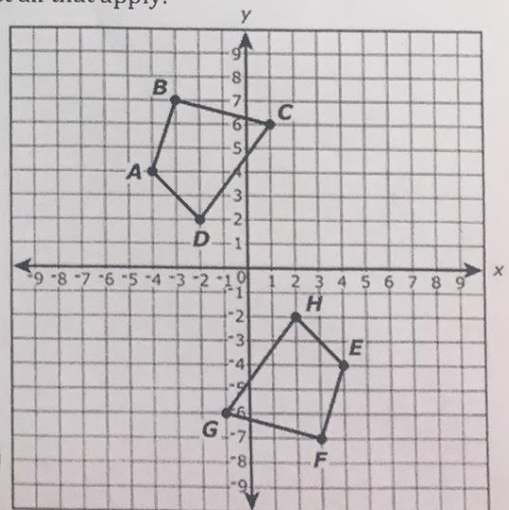
Level 5:

- Quadrilateral $EFGH$ is the image of $ABCD$ after a **transformation** or **composition of transformations**. Which could be the transformation or composition of transformations? Select all that apply.

- A translation of 3 units to the right and a reflection in the x -axis
- A rotation of 180° about the origin
- A translation of 12 units down and a reflection in the y -axis
- A reflection in the y -axis and a reflection in the x -axis
- A reflection in the line $y = x$

- Quadrilateral $ABCD$ will be reflected in the x -axis and then rotated 90° clockwise about the origin to create Quadrilateral $A'B'C'D'$. What will be the y -coordinate of B' ?

$(-3, 7) \rightarrow (-3, -7) \rightarrow (7, 3)$ y -coordinate = 3



Challenge Level: Find the image of the line $y = \frac{1}{2}x - 4$ under the following composition of transformations.

- Rotate 270° CW about the origin
- Reflected in the line $x = 2$

Rotate 270° CW $(-y, x)$

$$(0, -4) \rightarrow (4, 0)$$

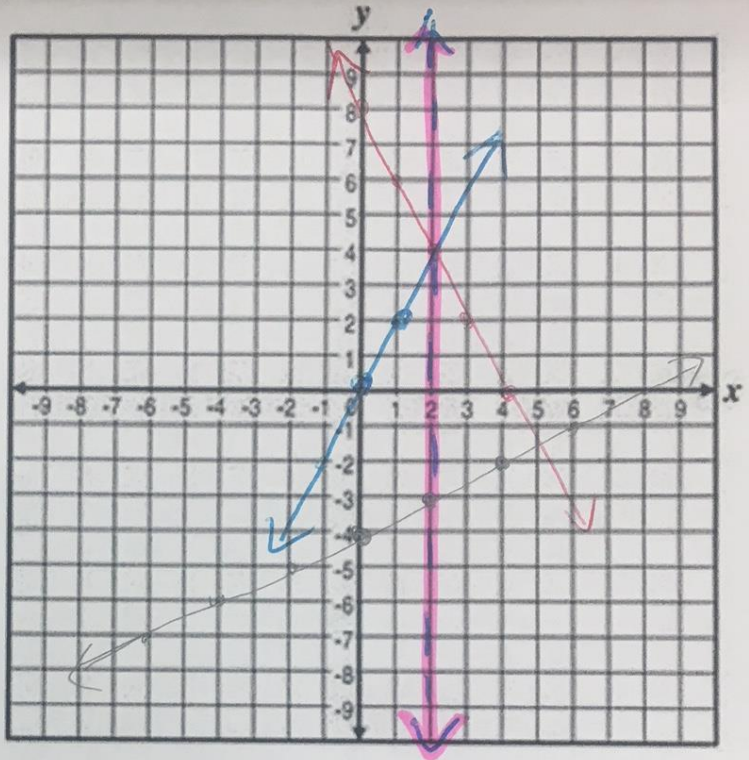
$$(2, -3) \rightarrow (3, 2)$$

Reflect in $x=2$

$$(4, 0) \rightarrow (0, 0)$$

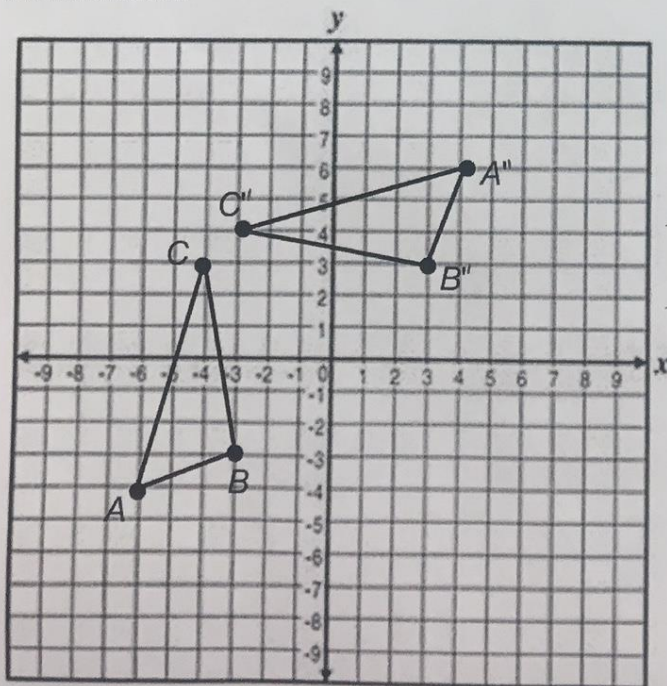
$$(3, 2) \rightarrow (1, 2)$$

$$y = 2x$$



Challenge Level 2:

Given A is mapped onto A'' by a composition of transformations. Identify a possible composition of two transformations.



$$A(-6, -4) \rightarrow A''(4, 6)$$

- Reflect in the y -axis

- Rotate 90° CCW

(or 270° CW)