

Reflections

A reflection flips a figure.

The size of the image is preserved.

The orientation is not preserved

The symbol is r.

x-axis
 $(x, y) \rightarrow (x, -y)$

y-axis
 $(x, y) \rightarrow (-x, y)$

$y = x$
 $(x, y) \rightarrow (y, x)$

$y = -x$
 $(x, y) \rightarrow (-y, -x)$

When reflecting over a horizontal or vertical line such as $x = 3$ or $y = -6$, you must count the boxes!

Rotations

A rotation turns a figure.

The size of the image is preserved.

The orientation is preserved.

The symbol is R.

90°
 $(x, y) \rightarrow (-y, x)$

180°
 $(x, y) \rightarrow (-x, -y)$

270°
 $(x, y) \rightarrow (y, -x)$

A rotation of -90° is clockwise and equal to a rotation of 270°

Translations

A translation slides a figure.

The size of the image is preserved.

The orientation is preserved.

The symbol is T.

$$(x, y) \rightarrow (x + a, y + b)$$

Dilations

A dilation makes a figure larger or smaller.

The size of the image is not preserved.

The orientation is preserved.

The symbol is D.

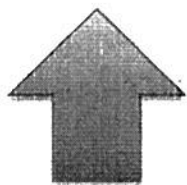
Name _____ KEY.

Unit 4 Review Sheet

Important Terms to recall/understand:

- Point Symmetry
- Line Symmetry
- Rotational Symmetry
- Line of Symmetry
- Transformation
- Isometric (Direct/Opposite)
- Reflection
- Rotation
- Center of Rotation
- Translation
- Dilation
- Orientation
- Preserved

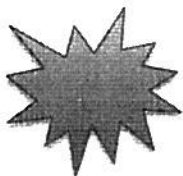
1. Do the following figures have line, point, and/or rotational symmetry?



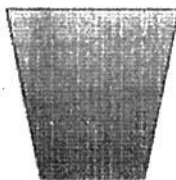
Line? Y N
Point? Y N
Rotational? Y N



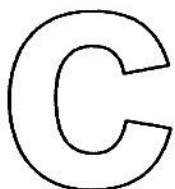
Line? Y N
Point? Y N
Rotational? Y N



Line? Y N
Point? Y N
Rotational? Y N



Line? Y N
Point? Y N
Rotational? Y N

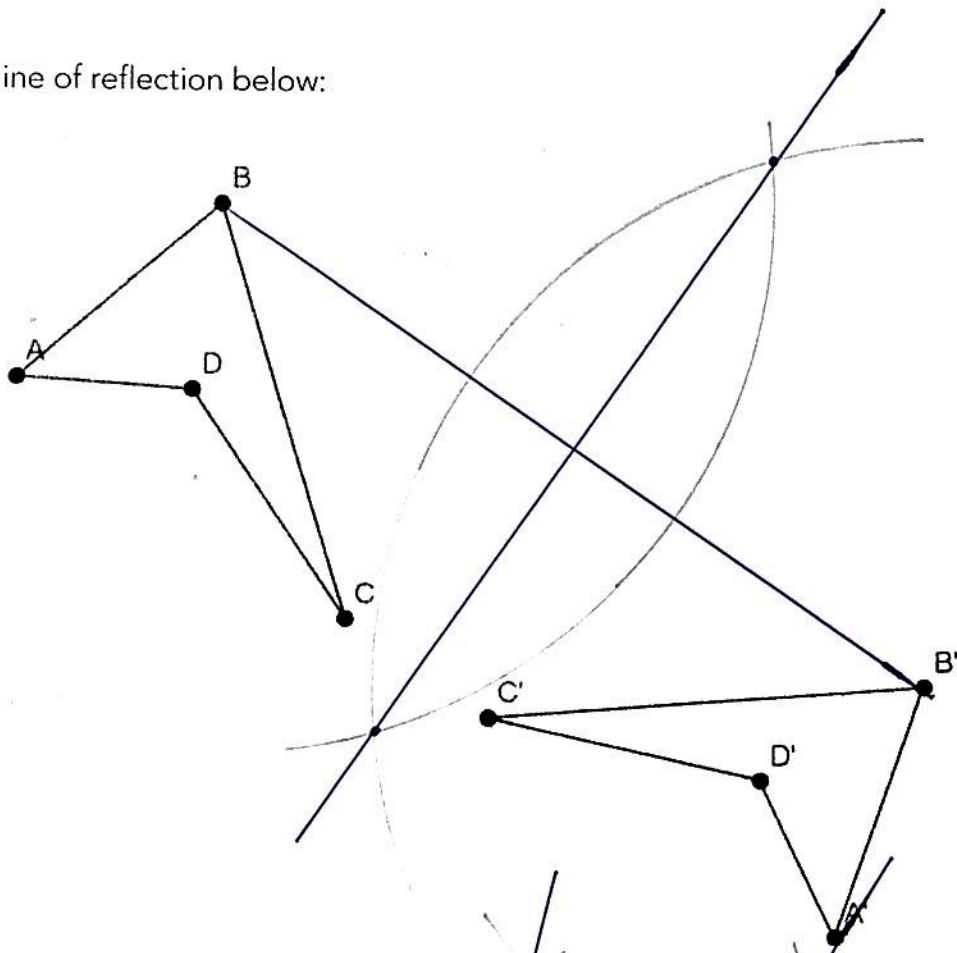


Line? Y N
Point? Y N
Rotational? Y N

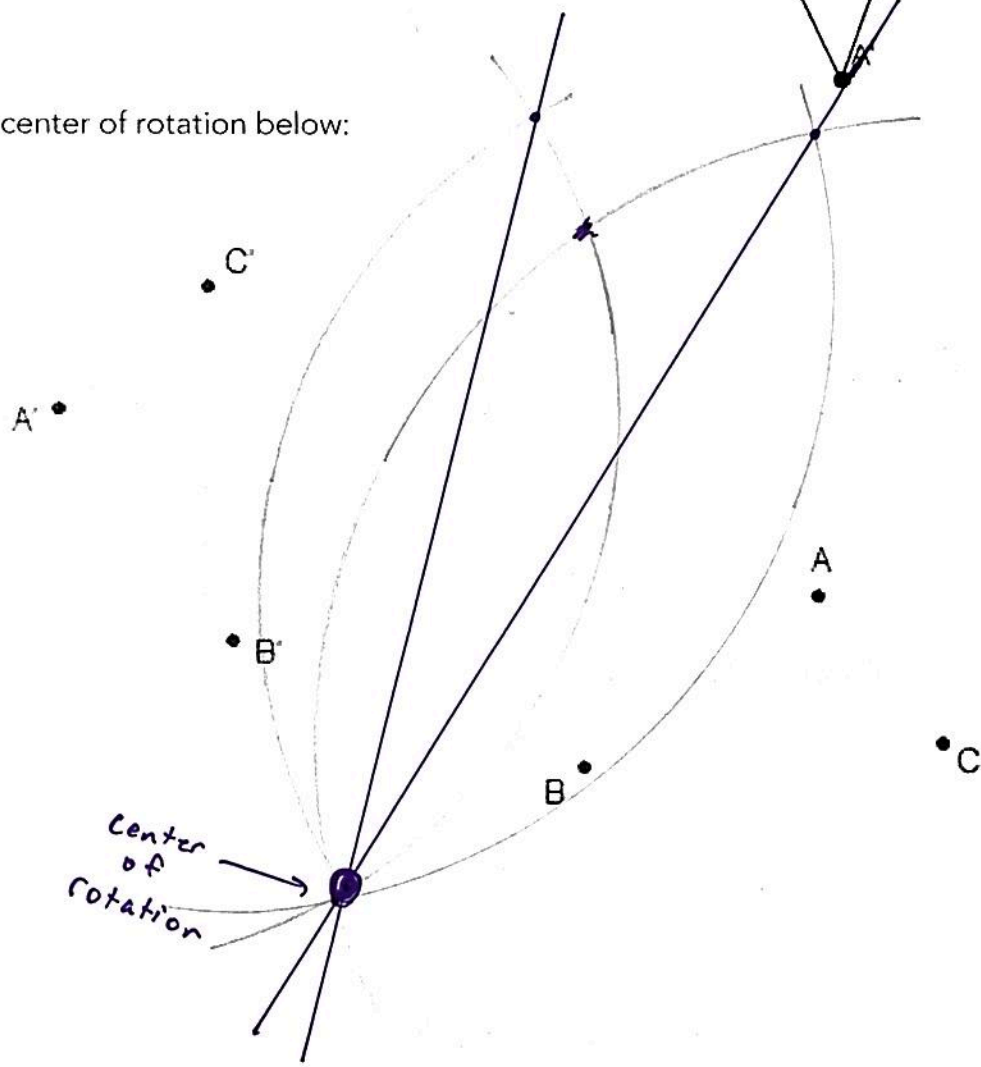


Line? Y N
Point? Y N
Rotational? Y N

2. Construct the line of reflection below:



Construct the center of rotation below:



4. Find the image of $(6, -2)$ under the given transformation. (the use of the graph is optional)

a) Reflection in the line $y=4$

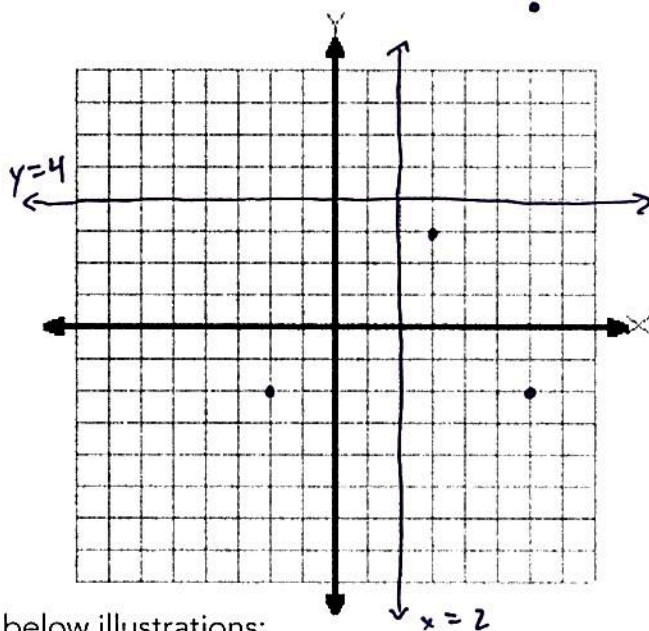
$(6, 10)$

b) Reflection in the line $x=2$

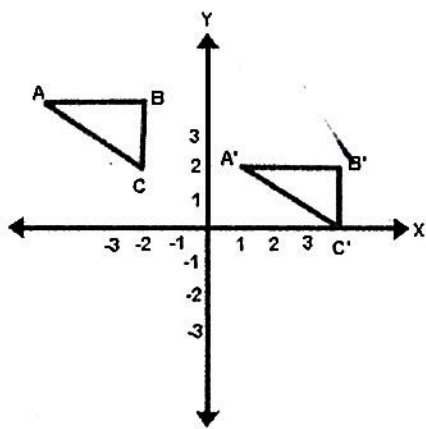
$(-2, -2)$

c) The translation $T_{3,5}$

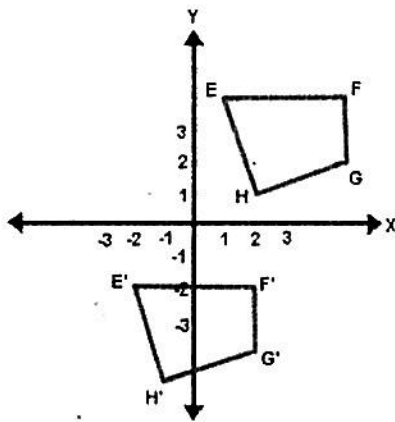
$(3, 3)$



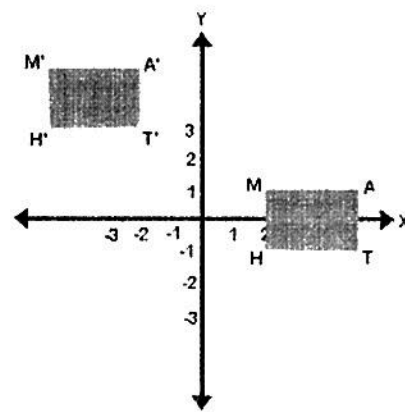
5. Name the translation taking place for each of the below illustrations:



$T_{(6, -2)}$



$T_{(-3, -6)}$



$T_{(-7, 4)}$

6. Name a rotation equivalent to R_{90° -270°

7. Name a rotation equivalent to R_{180° -180°

8. Name a rotation equivalent to R_{270° -90°

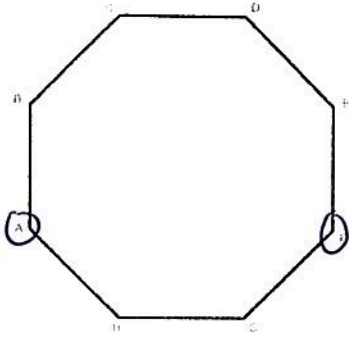
9. A translation maps $(7, 2)$ onto $(4, -2)$. What is the image of $(10, 4)$ under the same translation?

$T_{(-3, -4)} \rightarrow \boxed{(7, 0)}$

10. A translation maps $(-6, -4)$ onto $(-10, -13)$. What is the image of $(9, 8)$ under the same translation?

$T_{(-4, -9)} \rightarrow \boxed{(5, -1)}$

11. How many degrees should you rotate the below regular octagon clockwise to map A onto F?



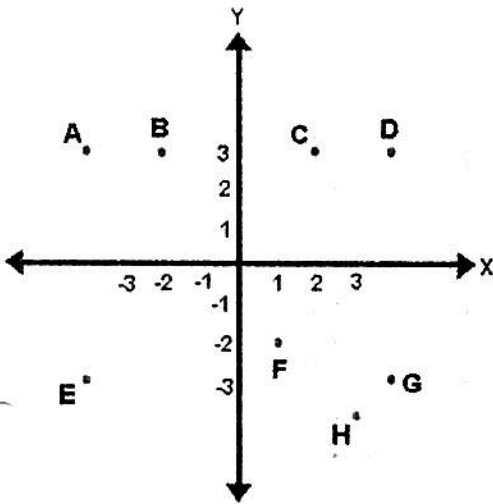
$$\frac{360}{8} = 45^\circ \text{ per turn}$$

5 turns

$$\frac{360}{8} = 45^\circ$$

$$\begin{array}{r} 45 \\ \times 5 \\ \hline 225^\circ \end{array}$$

12. Use the figure below to answer the following questions:



a. Which point is a reflection of point A over the x-axis? E

b. Which point is a reflection of point A over the y-axis? D

c. Which point is a reflection of point A over the line $y=x$? H

13. What is the image of A (3,7) under the composite $r_{x\text{-axis}} \circ T_{(3,-4)}$

$$A' (6, 3)$$

$$A'' (6, -3)$$

14. What is the image of B (-2,-8) under the composite $r_{y\text{-axis}} \circ R_{0,180}$

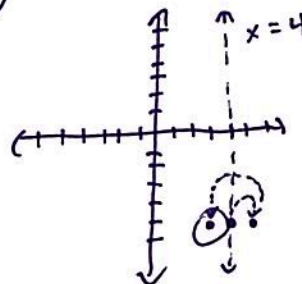
$$B' (2, 8)$$

$$B'' (-2, 8)$$

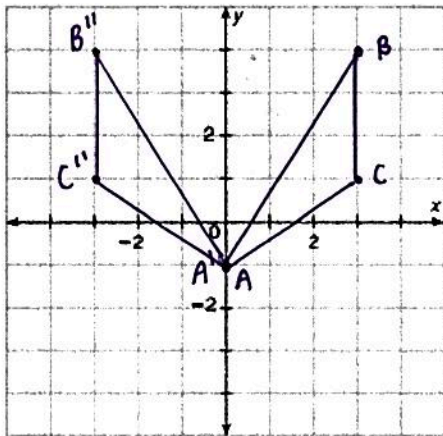
15. What is the image of C (4,-5) under the composite $r_{x=4} \circ r_{y=-x}$

$$C' (5, -4)$$

$$C'' (3, -4)$$



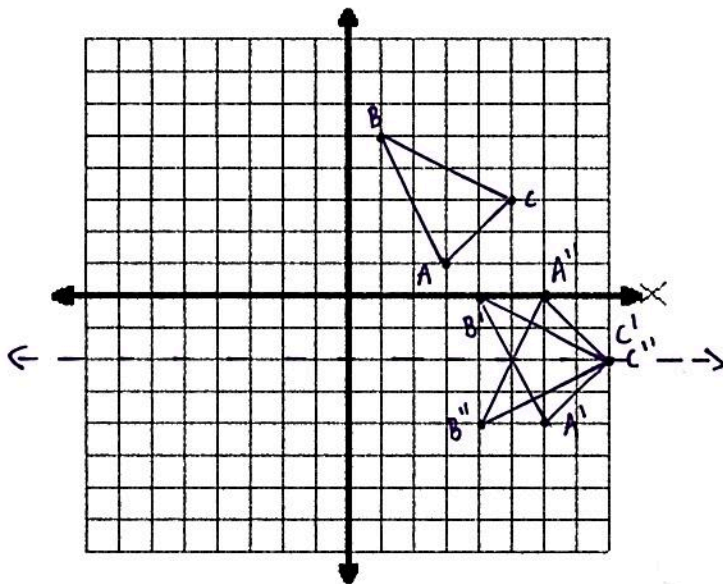
16. $\triangle ABC$ has vertices $A(0, -1)$, $B(3, 4)$, and $C(3, 1)$. Rotate $\triangle ABC$ 180° about the origin and then reflect it across the x -axis.



$$\begin{aligned} A' & (0, 1) \\ B' & (-3, -4) \\ C' & (-3, -1) \\ A'' & (0, -1) \\ B'' & (-3, 4) \\ C'' & (-3, 1) \end{aligned}$$

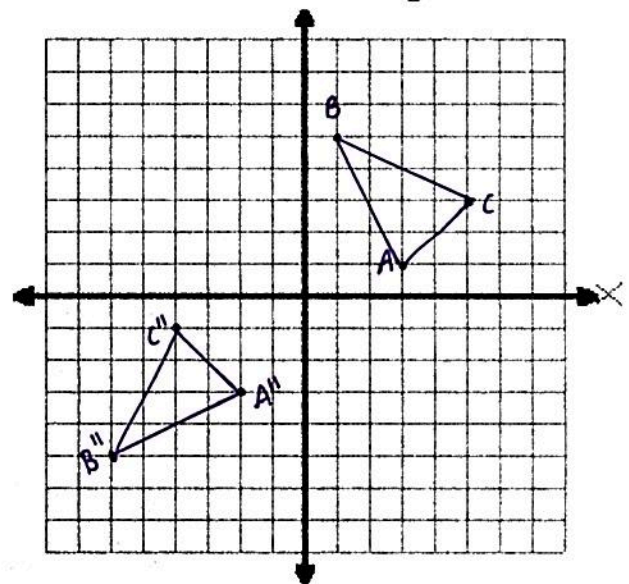
17. The vertices of $\triangle ABC$ are $A(3, 1)$, $B(1, 5)$, and $C(5, 3)$. Graph the image of $\triangle ABC$ after a composition of the transformations in the order they are listed.

Translation: $(x, y) \rightarrow (x + 3, y - 5)$
Reflection: in $y = -2$



$$\begin{aligned} A' & (6, -4) \\ B' & (4, 0) \\ C' & (8, -2) \\ A'' & (6, 0) \\ B'' & (4, -4) \\ C'' & (8, -2) \end{aligned}$$

Translation: $(x, y) \rightarrow (x - 6, y + 1)$
Rotation: 90° about the origin



$$\begin{aligned} A' & (-3, 2) \\ B' & (-5, 6) \\ C' & (-1, 4) \\ A'' & (-2, -3) \\ B'' & (-6, -5) \\ C'' & (-4, -1) \end{aligned}$$