

Geometry – Unit 2 Practice
Composite Transformations

G.CO.A.5

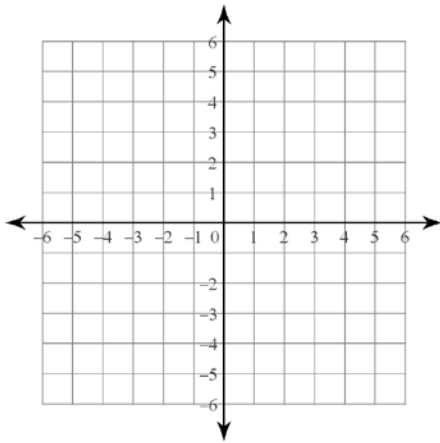
Name: _____!

Date: _____ Pd: _____

You should already know how to do the following:

- Translations (slides)
- Reflections (flips, like with a mirror)
- Rotations (spins or turns)

1) Translate $\triangle QRS$ if $Q(4, 1)$, $R(1, -2)$, $S(2, 3)$ by the rule $(x, y) \rightarrow (x - 3, y - 4)$.

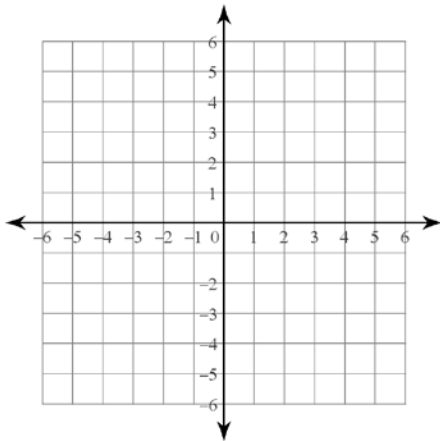


$Q'(\underline{\quad}, \underline{\quad})$

$R'(\underline{\quad}, \underline{\quad})$

$S'(\underline{\quad}, \underline{\quad})$

2) Reflect $\triangle Q'R'S'$ if $Q'(1, -3)$, $R'(-2, -6)$, and $S'(-1, -1)$ over the x-axis.

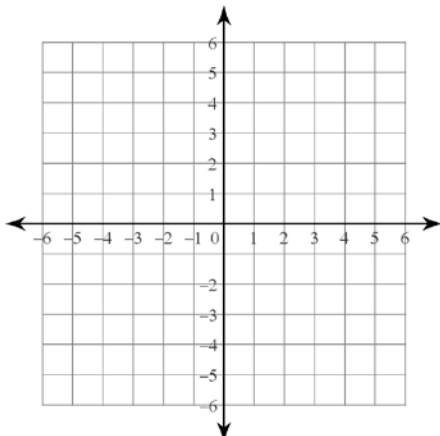


$Q''(\underline{\quad}, \underline{\quad})$

$R''(\underline{\quad}, \underline{\quad})$

$S''(\underline{\quad}, \underline{\quad})$

3) Rotate $\triangle CAR$ if $C(-1, -4)$, $A(2, 3)$, $R(-3, -2)$ over the line $y = x$.



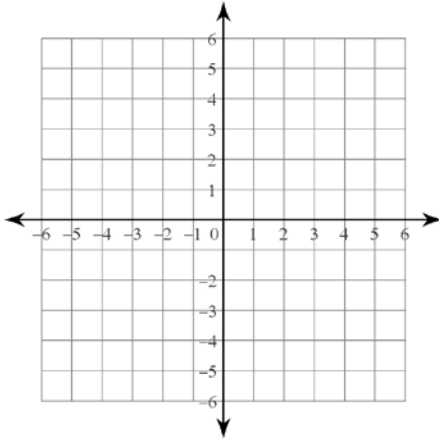
$C'(\underline{\quad}, \underline{\quad})$

$A'(\underline{\quad}, \underline{\quad})$

$R'(\underline{\quad}, \underline{\quad})$



- 4) Reflect $\triangle C'A'R'$ if $C'(1, 4)$, $A'(-2, -3)$, and $R'(3, 2)$ 180° about the origin.



$C''(\underline{\quad}, \underline{\quad})$
 $A''(\underline{\quad}, \underline{\quad})$
 $R''(\underline{\quad}, \underline{\quad})$

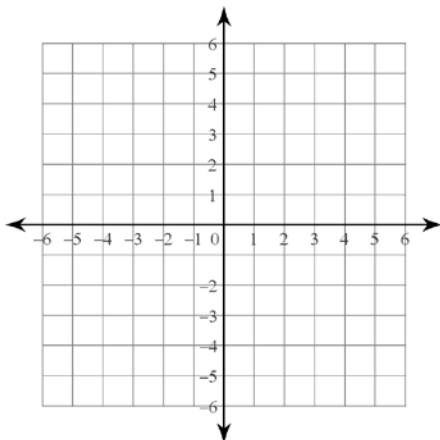
- 5) Look at questions 1 & 2 and questions 3 & 4.

- How are the shapes related?
- Explain how you could translate $\triangle QRS$ by the rule $(x, y) \rightarrow (x - 3, y - 4)$ and then reflect the image of the x -axis.
- Where does the final image end up?
- How would you rotate $\triangle CAR$ 180° about the origin and then reflect it over the line $y = x$?

- 6) Also notice that on the previous page, when we did two transformations, the first image had one prime notation (one `), and the second image (after the second transformation) has two prime notations (``). This is the notation we are going to use. How many transformations would have been applied to a figure if it had four prime notations? (````)?

- 7) Now try some multiple transformations:

- Translate $\triangle ALT$ if $A(-5, -1)$, $L(-3, -2)$, $T(-3, 2)$ by the rule $(x, y) \rightarrow (x + 6, y - 3)$, then reflect the image over the y -axis.

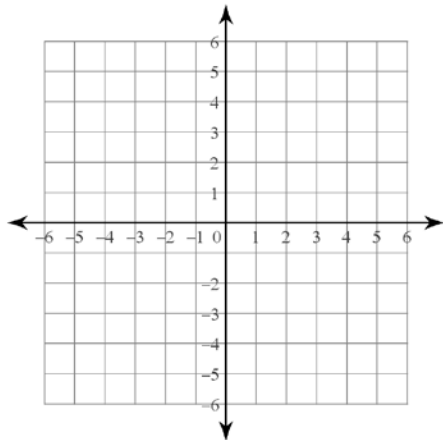


$A'(\underline{\quad}, \underline{\quad})$
 $L'(\underline{\quad}, \underline{\quad})$
 $T'(\underline{\quad}, \underline{\quad})$

 $A''(\underline{\quad}, \underline{\quad})$
 $L''(\underline{\quad}, \underline{\quad})$
 $T''(\underline{\quad}, \underline{\quad})$



- b) Reflect $\triangle TAB$ if $T(2, 3)$, $A(1, 1)$, and $B(4, -3)$ over the x -axis, then reflect the image over the y -axis.



$T'(\underline{\quad}, \underline{\quad})$

$A'(\underline{\quad}, \underline{\quad})$

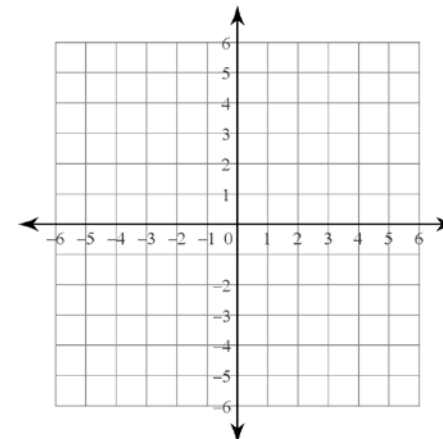
$B'(\underline{\quad}, \underline{\quad})$

$T''(\underline{\quad}, \underline{\quad})$

$A''(\underline{\quad}, \underline{\quad})$

$B''(\underline{\quad}, \underline{\quad})$

- c) Rotate $\triangle ALT$ if $A(-5, -1)$, $L(-3, -2)$, $T(-3, 2)$ 90° clockwise about the origin, then reflect the image over the line $y = x$.



$A'(\underline{\quad}, \underline{\quad})$

$L'(\underline{\quad}, \underline{\quad})$

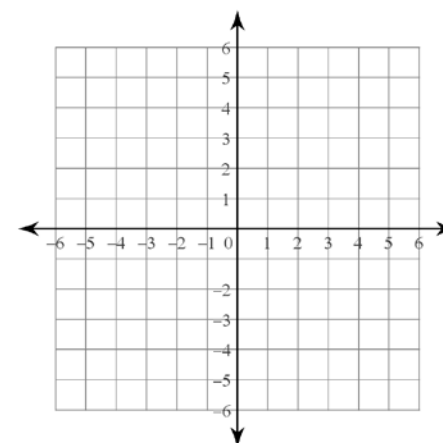
$T'(\underline{\quad}, \underline{\quad})$

$A''(\underline{\quad}, \underline{\quad})$

$L''(\underline{\quad}, \underline{\quad})$

$T''(\underline{\quad}, \underline{\quad})$

- d) Reflect $\triangle TAB$ if $T(2, 3)$, $A(1, 1)$, and $B(4, -3)$ over the y -axis, then translate the image by the rule $(x, y) \rightarrow (x + 2, y - 1)$.



$T'(\underline{\quad}, \underline{\quad})$

$A'(\underline{\quad}, \underline{\quad})$

$B'(\underline{\quad}, \underline{\quad})$

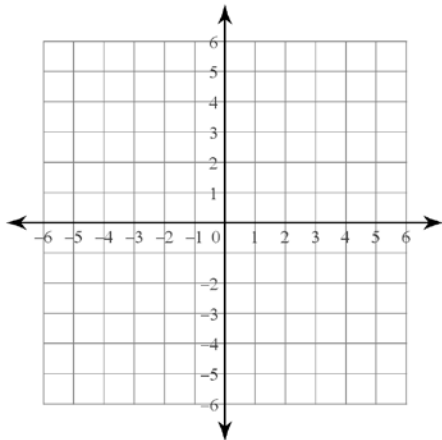
$T''(\underline{\quad}, \underline{\quad})$

$A''(\underline{\quad}, \underline{\quad})$

$B''(\underline{\quad}, \underline{\quad})$



- e) Rotate $\triangle ALT$ if $A(-5, -1)$, $L(-3, -2)$, $T(-3, 2)$ 180° clockwise about the point $(-1, -1)$, then reflect the image over the line $x = 1$.



$A'(\underline{\quad}, \underline{\quad})$

$L'(\underline{\quad}, \underline{\quad})$

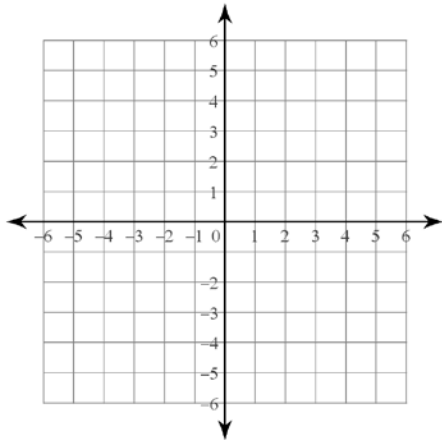
$T'(\underline{\quad}, \underline{\quad})$

$A''(\underline{\quad}, \underline{\quad})$

$L''(\underline{\quad}, \underline{\quad})$

$T''(\underline{\quad}, \underline{\quad})$

- f) Reflect $\triangle TAB$ if $T(2, 3)$, $A(1, 1)$, and $B(4, -3)$ over the line $y = 2$, then translate the image by the rule $(x, y) \rightarrow (x - 5, y - 4)$.



$T'(\underline{\quad}, \underline{\quad})$

$A'(\underline{\quad}, \underline{\quad})$

$B'(\underline{\quad}, \underline{\quad})$

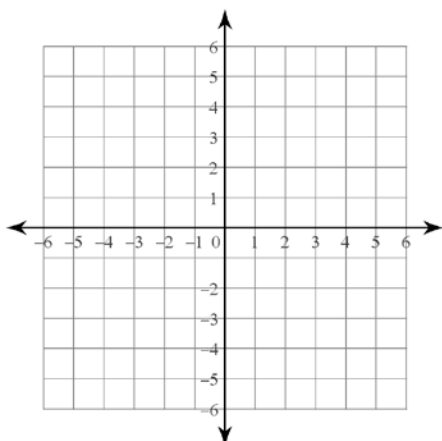
$T''(\underline{\quad}, \underline{\quad})$

$A''(\underline{\quad}, \underline{\quad})$

$B''(\underline{\quad}, \underline{\quad})$

- 8) Explore if the order in which you perform multiple transformations matters.

- a) Translate $\triangle ALT$ if $A(-5, -1)$, $L(-3, -2)$, $T(-3, 2)$ by the rule $(x, y) \rightarrow (x + 3, y + 2)$, then reflect the image over the y -axis.



$A'(\underline{\quad}, \underline{\quad})$

$L'(\underline{\quad}, \underline{\quad})$

$T'(\underline{\quad}, \underline{\quad})$

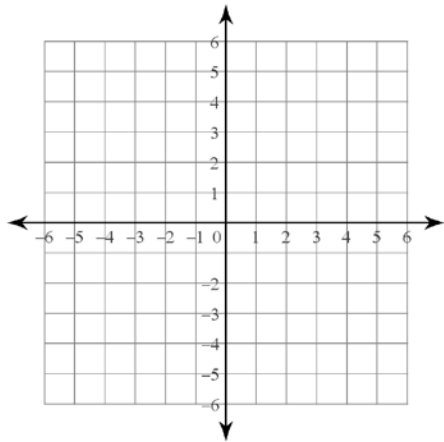
$A''(\underline{\quad}, \underline{\quad})$

$L''(\underline{\quad}, \underline{\quad})$

$T''(\underline{\quad}, \underline{\quad})$



- b) Reflect $\triangle ALT$ if $A(-5, -1)$, $L(-3, -2)$, $T(-3, 2)$ over the y -axis, then translate the image by the rule $(x, y) \rightarrow (x + 3, y + 2)$.



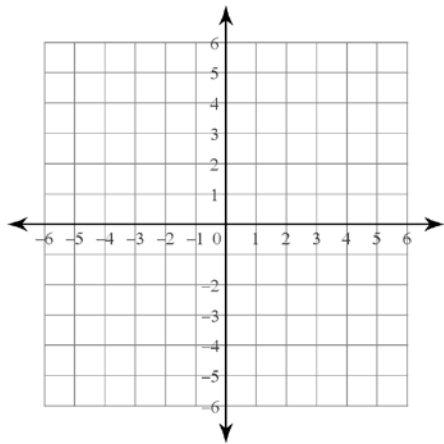
$A'(\underline{\quad}, \underline{\quad})$
 $L'(\underline{\quad}, \underline{\quad})$
 $T'(\underline{\quad}, \underline{\quad})$

$A''(\underline{\quad}, \underline{\quad})$
 $L''(\underline{\quad}, \underline{\quad})$
 $T''(\underline{\quad}, \underline{\quad})$

- c) Did the order you performed the transformations change the placement of the final image?

- 9) What about with rotations and reflections?

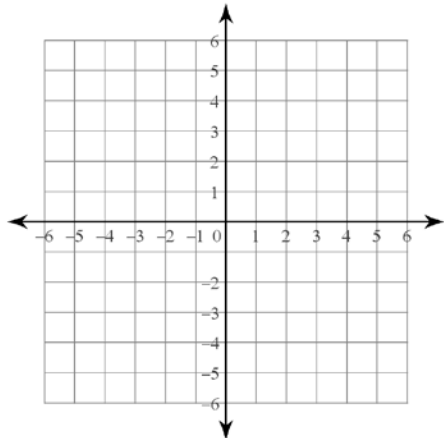
- a) Rotate $\triangle TAB$ if $T(2, 3)$, $A(1, 1)$, $B(4, -3)$ 90° clockwise about the origin, then reflect the image over the x -axis.



$T'(\underline{\quad}, \underline{\quad})$
 $A'(\underline{\quad}, \underline{\quad})$
 $B'(\underline{\quad}, \underline{\quad})$

$T''(\underline{\quad}, \underline{\quad})$
 $A''(\underline{\quad}, \underline{\quad})$
 $B''(\underline{\quad}, \underline{\quad})$

- b) Reflect $\triangle TAB$ if $T(2, 3)$, $A(1, 1)$, and $B(4, -3)$ over the x -axis, then rotate the image 90° clockwise about the origin.



$T'(\underline{\quad}, \underline{\quad})$
 $A'(\underline{\quad}, \underline{\quad})$
 $B'(\underline{\quad}, \underline{\quad})$

$T''(\underline{\quad}, \underline{\quad})$
 $A''(\underline{\quad}, \underline{\quad})$
 $B''(\underline{\quad}, \underline{\quad})$

- c) Did the order you performed the transformations change the placement of the final image?