Name _____ Date _____ Period _____

Geometry – Multiple Transformations

The following worksheet is for you to discover how to do MULTIPLE TRANSFORMATIONS!
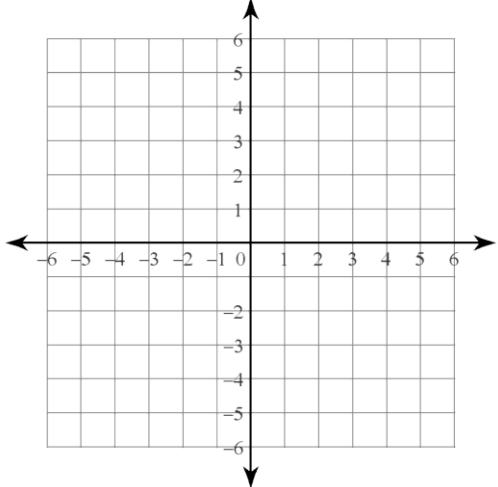Work with your group– but make sure you are **WORKING THE WHOLE PERIOD!!!**
You should already know how to do the following:
- Translations (slides)
- Reflections (flips, like with a mirror)
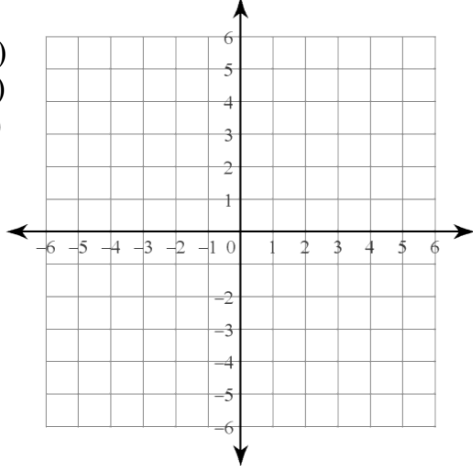- Rotations (spins or turns)
Let's start out with some easier single-transformations to get "warmed-up".

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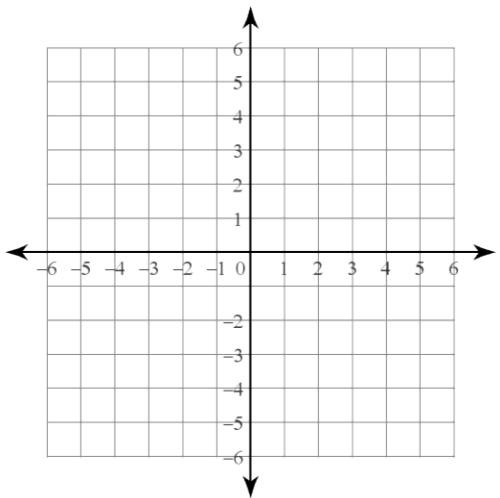by the rule (x,y)$\rightarrow$(x – 3, y – 4)

Q' (____,____)
R' (____,____)
S' (____,____)

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

Q''(____,____)
R''(____,____)
S''(____,____)

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

C'(____,____)
A'(____,____)
R'(____,____)

4) Reflect $\triangle$ C'A'R' if C'(1,4), A'(-2,-3),
and R'(3,2) over the line $y = x$

C''(____,____)
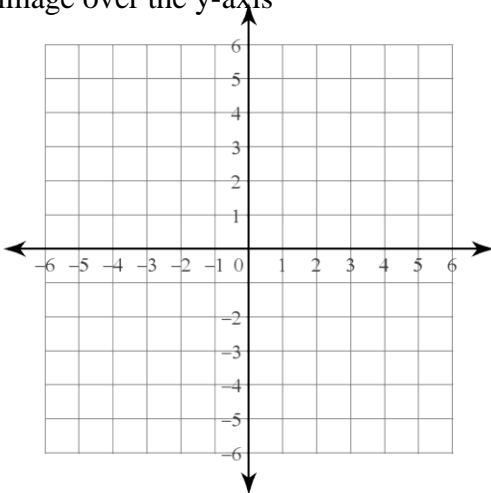A''(____,____)
R''(____,____)

5) What did you notice in problems 1&2 and problems 3&4. How were 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? (````)?

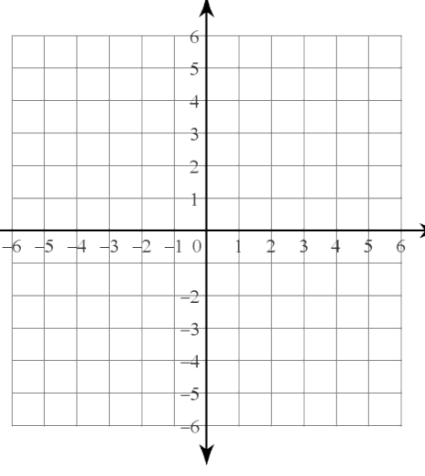7) Now you are going to try some multiple transformations:

a) Translate ∆ALT if A(-5,-1), L(-3,-2), T(-3,2) by the rule (x,y)→(x +6, y − 3), then reflect the image over the y-axis

A' (____,____)
L' (____,____)
T' (____,____)

A''(____,____)
L''(____,____)
T''(____,____)
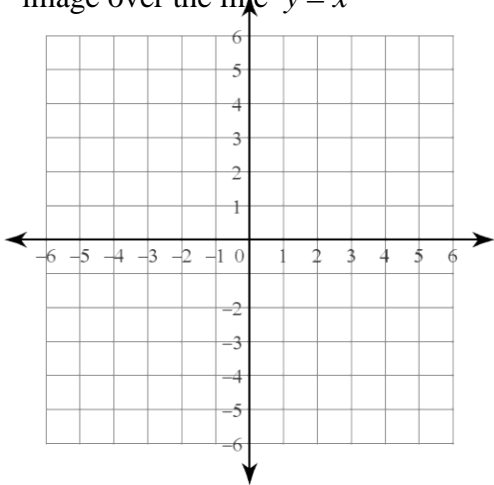
b)Reflect ∆TAB if T(2,3), A(1,1), and B(4,-3) over the x-axis, then reflect the image over the y-axis

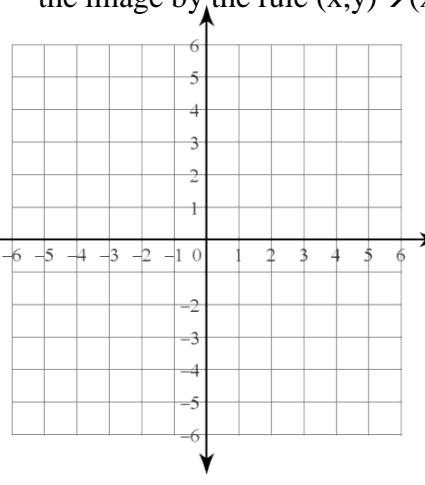T'(____,____)
A'(____,____)
B'(____,____)

T''(____,____)
A''(____,____)
B''(____,____)

c) Rotate ∆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' (____,____)
L' (____,____)
T' (____,____)

A''(____,____)
L''(____,____)
T''(____,____)

d)Reflect ∆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)→(x +2, y − 1)

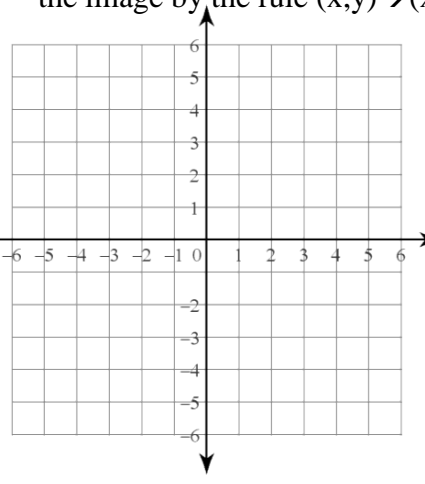T'(____,____)
A'(____,____)
B'(____,____)

T''(____,____)
A''(____,____)
B''(____,____)

e) Rotate ∆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' (____,____)
L' (____,____)
T' (____,____)

A''(____,____)
L''(____,____)
T''(____,____)

f)Reflect ∆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)→(x − 5, y − 4)

T'(____,____)
A'(____,____)
B'(____,____)

T''(____,____)
A''(____,____)
B''(____,____)

8) Now we are going to explore if the order in which you to multiple transformations matters.

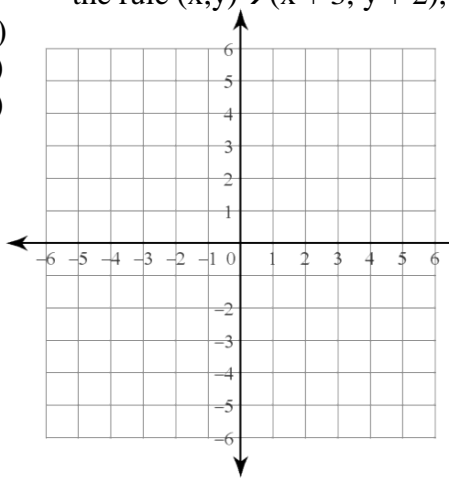a) Translate $\triangle ALT$ if A(-5,-1), L(-3,-2), T(-3,2) by the rule (x,y)➔(x + 3, y + 2), then reflect the image over the y-axis

A' (____,____)
L' (____,____)
T' (____,____)

A''(____,____)
L''(____,____)
T''(____,____)

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)➔(x + 3, y + 2),
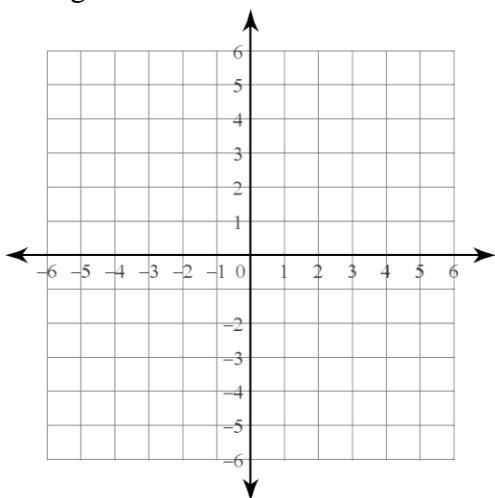
A'(____,____)
L'(____,____)
T'(____,____)

A''(____,____)
L''(____,____)
T''(____,____)

Did the order you did the transformations change the final image?

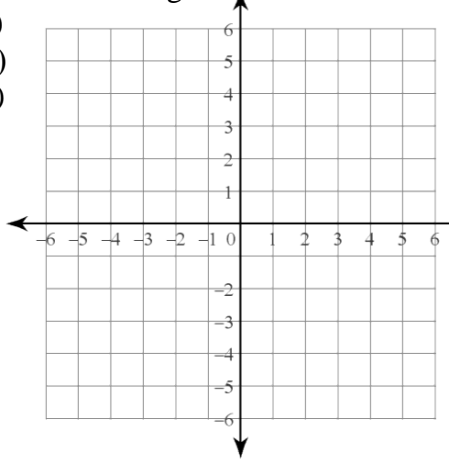So, does order matter?

What about with rotations and reflections?

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

T' (____,____)
A' (____,____)
B' (____,____)

T''(____,____)
A''(____,____)
B''(____,____)

d)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'(____,____)
A'(____,____)
B'(____,____)

T''(____,____)
A''(____,____)
B''(____,____)

Did the order you did the transformations change the final image?
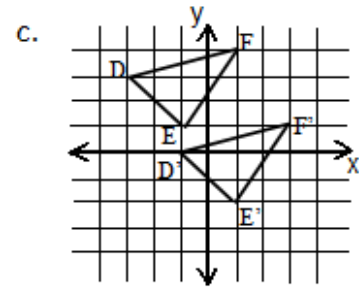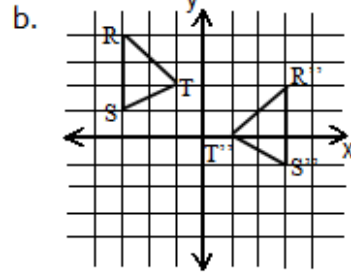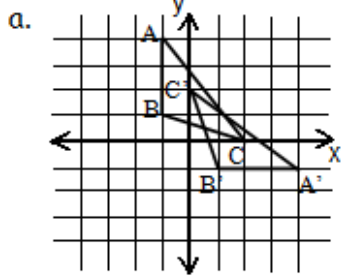
So, does order matter?

So, if you want to get the correct answer, should you do the transformations in the order given?
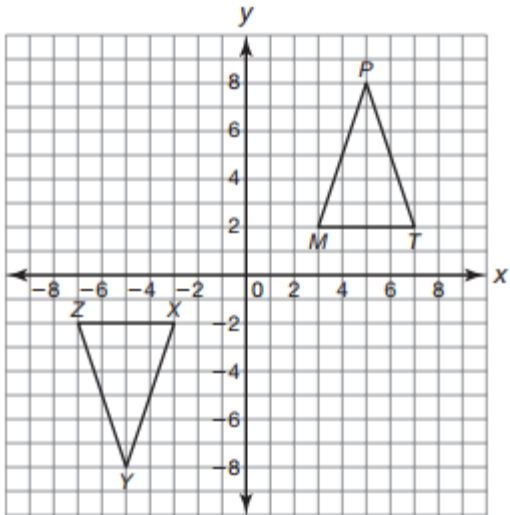
For this page you are going to try to discover what transformation(s) have taken place.

9.

Identify the transformation(s) that has taken place.

a.

b.

c.

d.

e.