Name _____ Date _____ Period _____

Geometry – Multiple Transformations

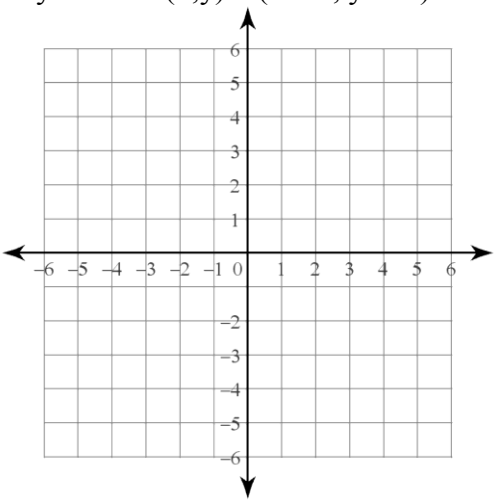
The following worksheet is for you to practice how to do MULTIPLE TRANSFORMATIONS!

You should already know how to do the following:

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

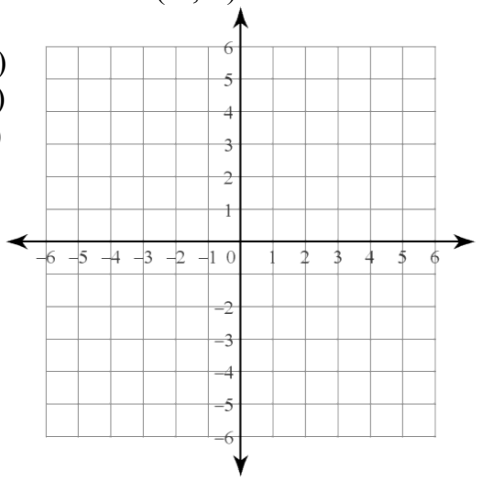
Let's start out with some easier single-transformations to get "warmed-up".

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



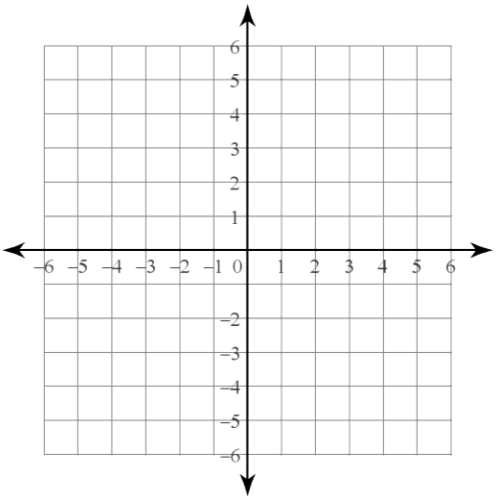
Q' (_____,_____)
R' (_____,_____)
S' (_____,_____)

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



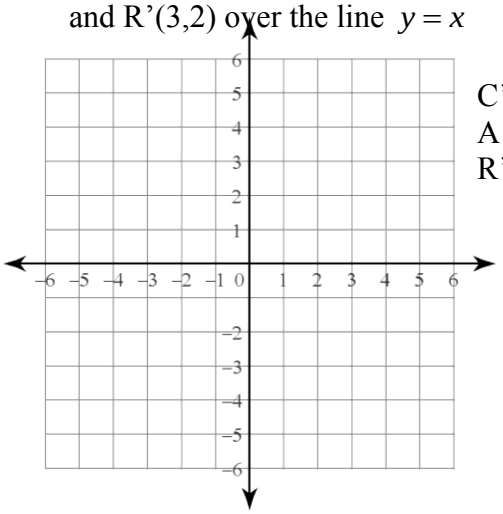
Q''(___,___)
R''(___,___)
S''(___,___)

3) Rotate ΔCAR if C(-1,-4), A(2,3), R(-3,-2) 180^o about the origin.



C'(___,___)
A'(___,___)
R'(___,___)

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



C''(___,___)
A''(___,___)
R''(___,___)

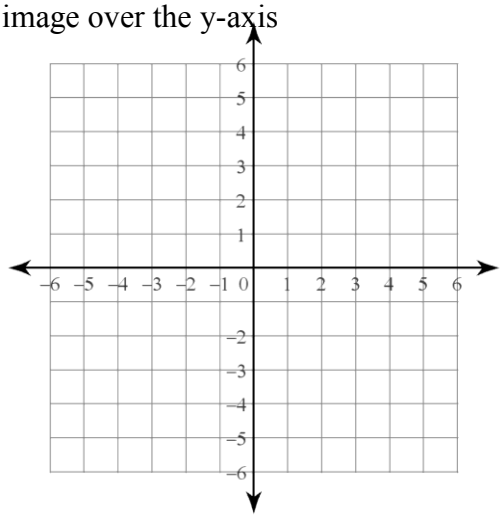
5) What did you notice in problems 1&2 and problems 3&4. How were the shapes related? Explain how you could translate ΔQRS by the rule $(x,y) \rightarrow (x-3, y-4)$ and then reflect the image of the x-axis. Where does the final image end up?

How would you rotate ΔCAR 180^o 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:

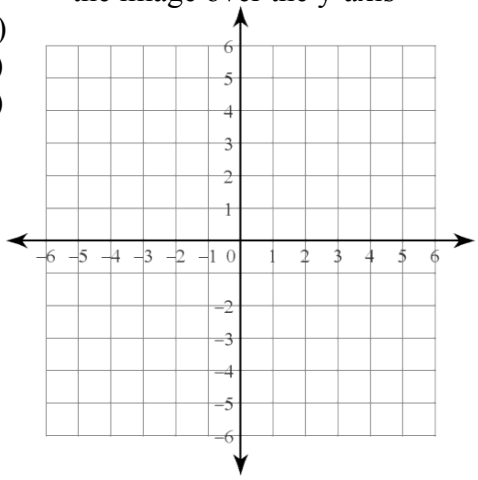
a) Translate ΔALT if A(-5,-1), L(-3,-2), T(-3,2) by the rule (x,y)→(x +6, y – 3), then reflect the image over the y-axis



A' (_____,_____)
L' (_____,_____)
T' (_____,_____)

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

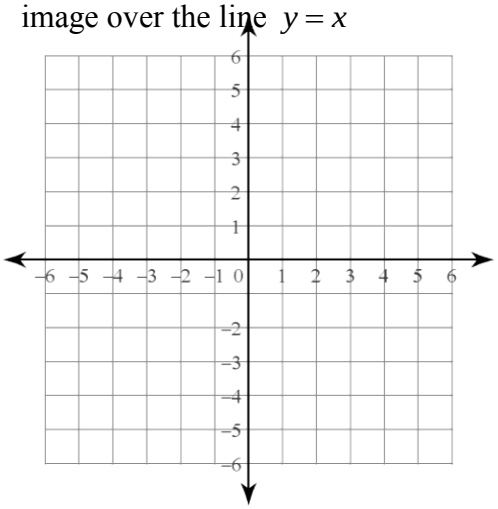
b)Reflect ΔTAB if T(2,3), A(1,1), and B(4,-3) over the x-axis, then reflect the image over the y-axis



T'(___,___)
A'(___,___)
B'(___,___)

T''(___,___)
A''(___,___)
B''(___,___)

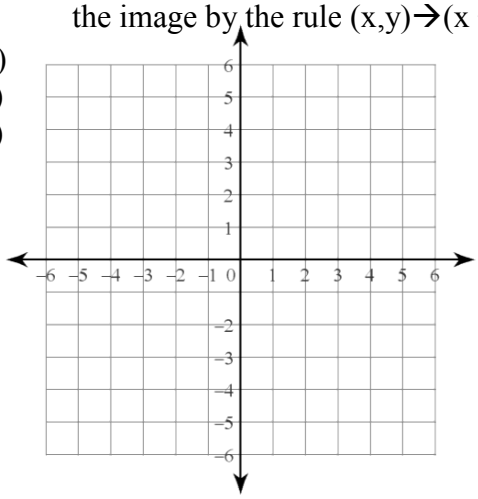
c) Rotate ΔALT if A(-5,-1), L(-3,-2), T(-3,2) 90^o clockwise about the origin, then reflect the image over the line $y = x$



A' (_____,_____)
L' (_____,_____)
T' (_____,_____)

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

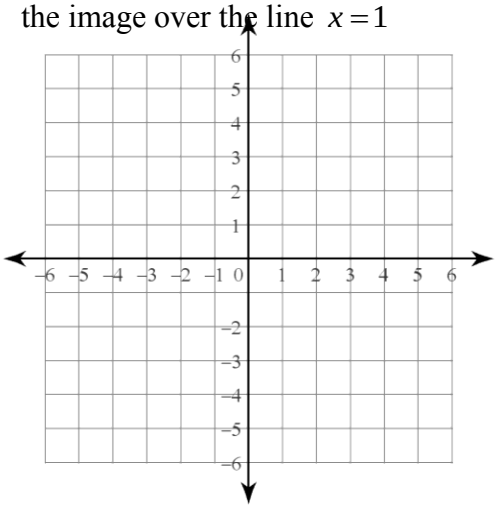
d)Reflect ΔTAB if T(2,3), A(1,1), and B(4,-3) over the y-axis, then translate the image by the rule (x,y)→(x +2, y – 1)



T'(___,___)
A'(___,___)
B'(___,___)

T''(___,___)
A''(___,___)
B''(___,___)

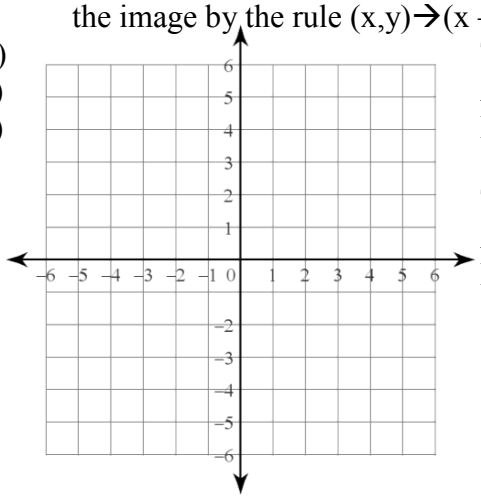
e) Rotate ΔALT if A(-5,-1), L(-3,-2), T(-3,2) 180^o clockwise about the point (-1,-1), then reflect the image over the line $x = 1$



A' (_____,_____)
L' (_____,_____)
T' (_____,_____)

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

f)Reflect ΔTAB 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)

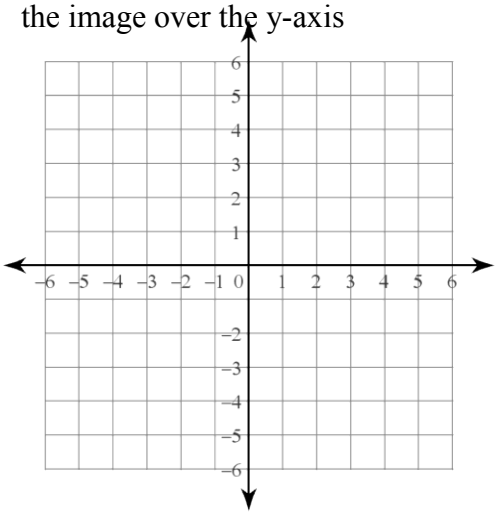


T'(___,___)
A'(___,___)
B'(___,___)

T''(___,___)
A''(___,___)
B''(___,___)

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

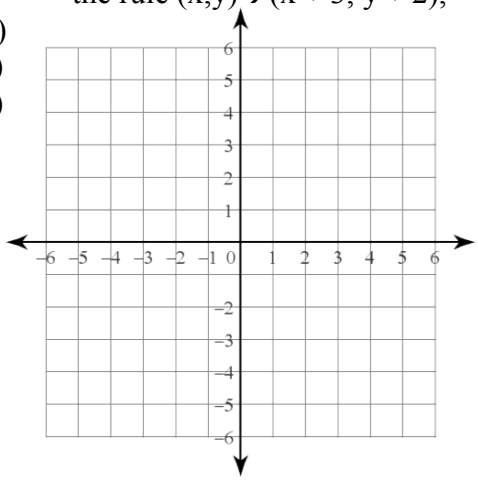
a) Translate ΔALT if A(-5,-1), L(-3,-2), T(-3,2) by the rule (x,y)→(x + 3, y + 2), then reflect the image over the y-axis



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

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

b)Reflect ΔALT 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'(___,___)

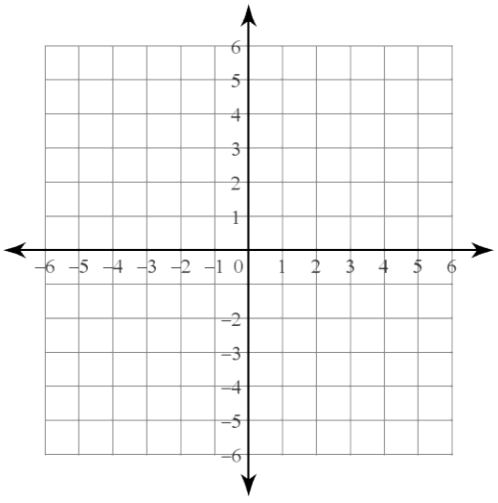
A''(___,___)
L''(___,___)
T''(___,___)

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

So, does order matter?

What about with rotations and reflections?

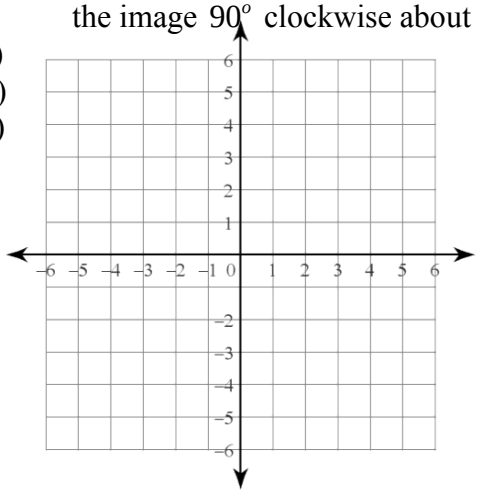
c) Rotate ΔTAB if T(2,3), A(1,1), B(4,-3) 90^o clockwise about the origin, then reflect the image over the line x-axis.



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

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

d)Reflect ΔTAB if T(2,3), A(1,1), and B(4,-3) over the x-axis, then rotate the image 90^o 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?

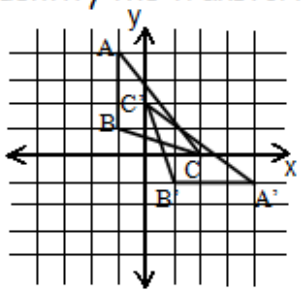
So, if you want to get the correct answer, should you do the transformations in the order given?

For this page you are going to try to discover what transformation(s) have taken place.

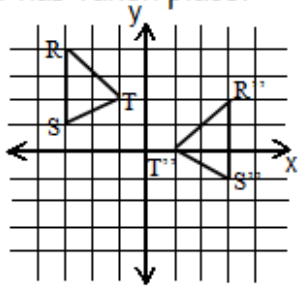
9.

Identify the transformation(s) that has taken place.

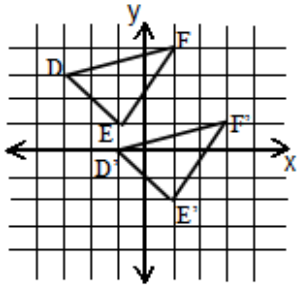
a.



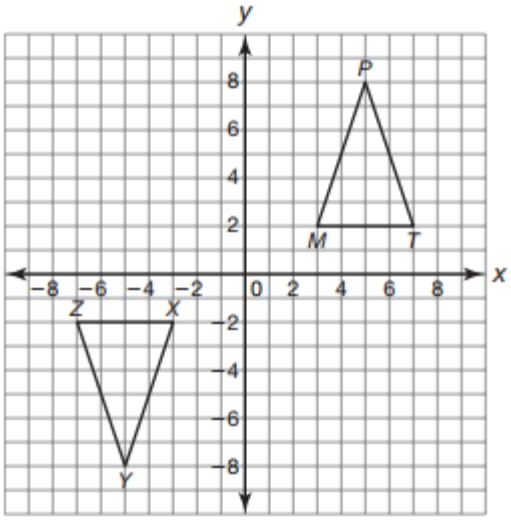
b.



c.



d.



e.