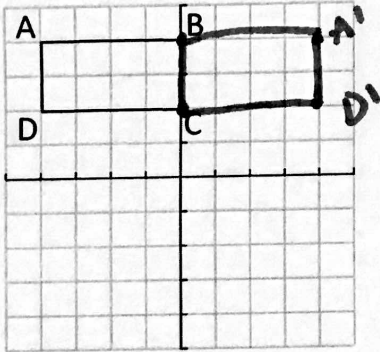**key** Name: _____

For each transformation, state the coordinates of the image of the point $(1, 4)$ and the general rule for the image of the point (x, y).

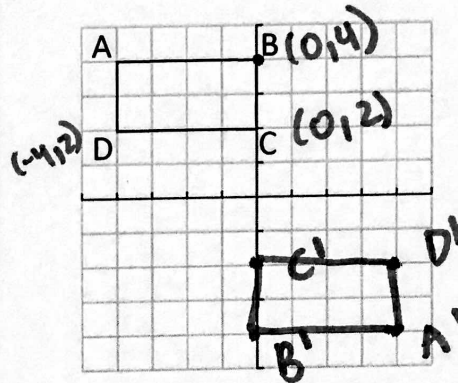|	Image of $(1, 4)$	Image of (x, y)
1. Reflect over y-axis	$(-1, 4)$	$(-x, y)$
2. Reflect over x-axis	$(1, -4)$	$(x, -y)$
3. Reflect over $y = x$	$(4, 1)$	(y, x)
4. Reflect over $y = -x$	$(-4, -1)$	$(-y, -x)$
5. Rotate 90° CCW about the origin	$(-4, 1)$	$(-y, x)$
6. Rotate 270° CCW about the origin	$(4, -1)$	$(y, -x)$
7. Rotate 180° about the origin	$(-1, -4)$	$(-x, -y)$

For each of the following, graph and label the image for each transformation and then write the rule.
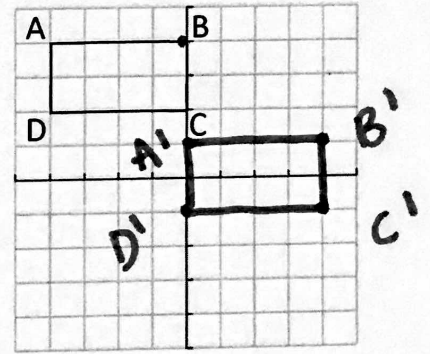
8. Reflect over the line y axis	9. Rotate 180° about the origin	10. Translate right 4 & down 3 units

Rule: $(x, y) \rightarrow (-x, y)$ Rule: $(x, y) \rightarrow (-x, -y)$ Rule: $(x, y) \rightarrow (x+4, y-3)$

Answer each of the following.

11. Find the image of $T(5, -3)$ under a transformation $(x, y) \rightarrow (x + 3, y - 5)$. $T'(8, -8)$

12. M is reflected over the y-axis. If M is $(6, -1)$, find M' $(-6, -1)$

13. C is rotated about the origin 90°. If C is $(-9, 5)$, find C' $(-5, -9)$

14. Y is rotated about the origin 180°. If Y is $(0, -3)$ find Y' $(0, 3)$

15. A figure is reflected over the line $y = x$. If the preimage is $(2, 7)$, find the image. $(7, 2)$

16. The only type of transformations that does not create a figure of the same size is: __dilation__

17. $\triangle ABC$ has vertices $A(5,-2)$, $B(-4,0)$, $C(7,1)$.
Find the coordinates of the image of the triangle if it is dilated by a scale factor of 2.

A'(10 , -4)

B'(-8 , 0)

C'(14 , 2)

18. $\triangle ABC$ has vertices $A(5,-2)$, $B(-4,0)$, $C(7,1)$.
Find the coordinates of the image of the triangle if it is reflected in the <u>x-axis</u>.

A'(5 , 2)

B'(-4 , 0)

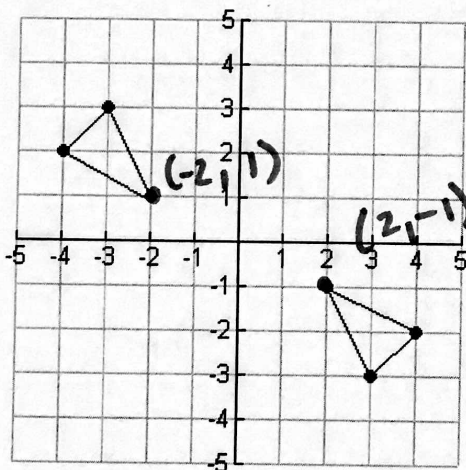C'(7 , -1)

19. Consider the pre-image point A (-4, -4). After a translation, A' is the points (0, -12).Find the translation and write the algebraic rule to represent the translation that occurred.

Shift right 4 and down 8

$$(x,y) \rightarrow (x+4, y-8)$$

20. Consider the following graph. Describe the transformation that is shown.

$180°$ rotation

$(-2, 1)$

$(2, -1)$

21. For each problem, there is a composition of motions. Using your algebraic rules, come up with a new rule after both transformations have taken place.

a. Translate a triangle 5 units left and 3 units up, and then reflect the triangle over the x-axis.

$$(x,y) \rightarrow (x-5, y+3)$$
$$(x,y) \rightarrow (x, -y)$$

$$\boxed{(x,y) \rightarrow (x-5, -y-3)}$$

b. Reflect in the line y = x, and then translate left 4 units and down 2 units.

$$(x,y) \rightarrow (y,x)$$
$$(x,y) \rightarrow (x-4, y-2)$$

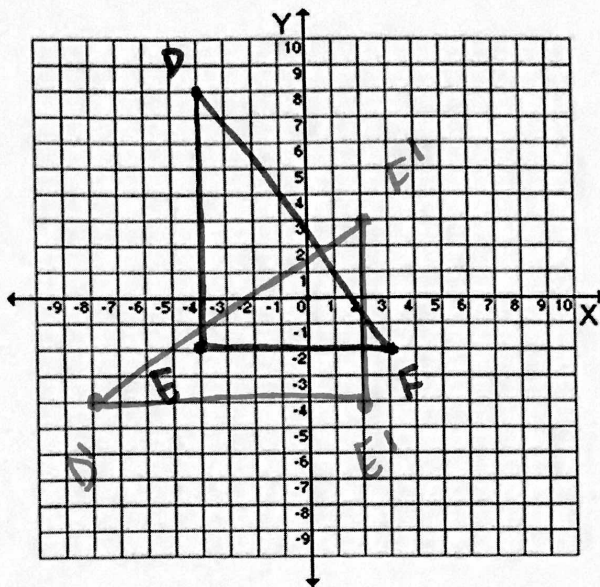$$\boxed{(x,y) \rightarrow (y-4, x-2)}$$

22. The vertices of a triangle are D(-4, 8), E(-4, -2) and F(3, -2). Name the vertices of the image rotated 90 degrees counter-clockwise
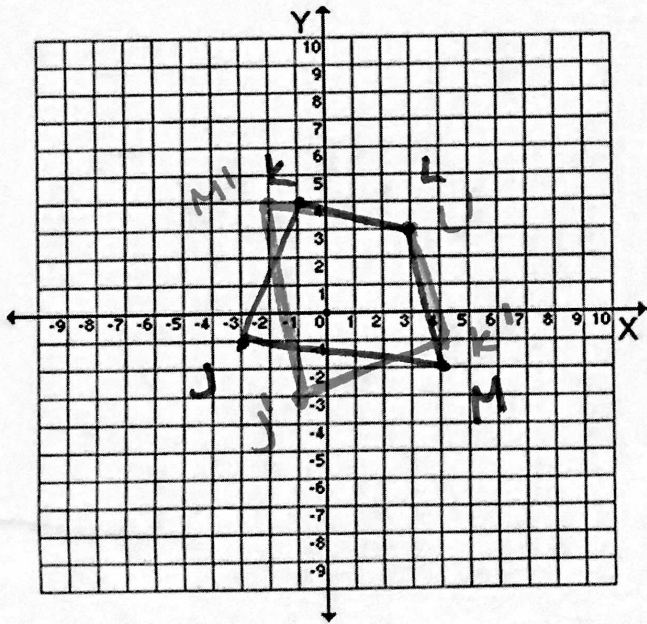
D' $(-8, -4)$ E' $(2, -4)$ F' $(2, 3)$

Algebraic Rule:

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

23. Graph the points J(–3, –1), K(–1, 4), L(3, 3) and M(4, –2) and then reflect over the line y=x.

Label the images and write the algebraic rule.

J' $(-1, -3)$ K' $(4, -1)$

L' $(3, 3)$ M' $(-2, 4)$

Algebraic Rule:

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