

Warm Up

Translate the Triangle using the rule  $(x+2, y-3)$

right 2, 3 down

What are the coordinates of the new triangle?

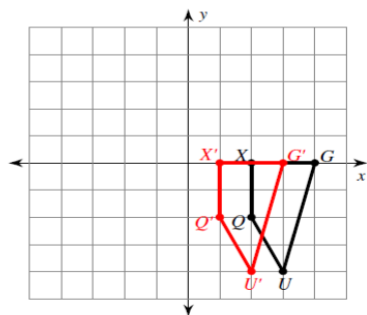
$(4, 4)$   
 $(4, 0)$   
 $(8, 0)$



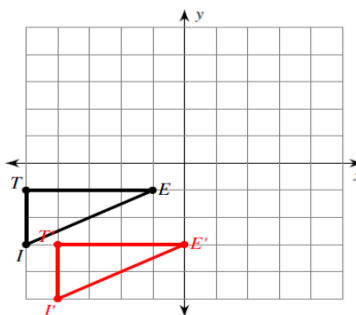
# Homework Questions?

Graph the image of the figure using the transformation given.

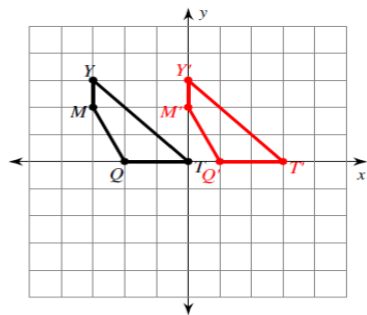
1) translation: 1 unit left



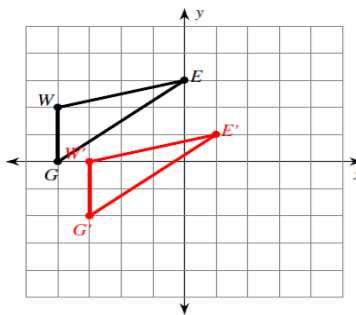
2) translation: 1 unit right and 2 units down



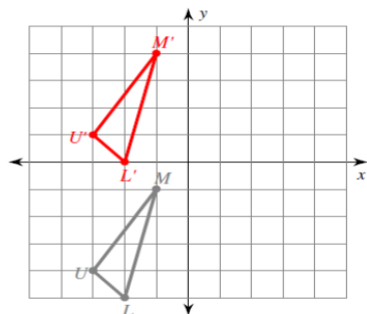
3) translation: 3 units right



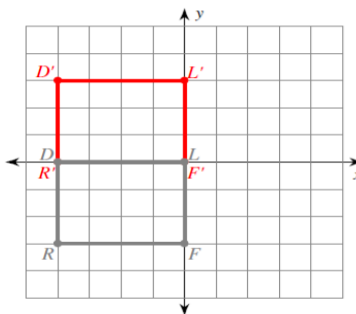
4) translation: 1 unit right and 2 units down



5) translation: 5 units up  
 $U(-3, -4)$ ,  $M(-1, -1)$ ,  $L(-2, -5)$



6) translation: 3 units up  
 $R(-4, -3)$ ,  $D(-4, 0)$ ,  $L(0, 0)$ ,  $F(0, -3)$



Find the coordinates of the vertices of each figure after the given transformation.

7) translation: 2 units left and 1 unit down  
 $Q(0, -1), D(-2, 2), V(2, 4), J(3, 0)$

$Q'(-2, -2), D'(-4, 1), V'(0, 3), J'(1, -1)$

8) translation: 2 units down  
 $D(-4, 1), A(-2, 5), S(-1, 4), N(-1, 2)$

$D'(-4, -1), A'(-2, 3), S'(-1, 2), N'(-1, 0)$

9) translation: 4 units left and 4 units up  
 $J(-1, -2), A(-1, 0), N(3, -3)$

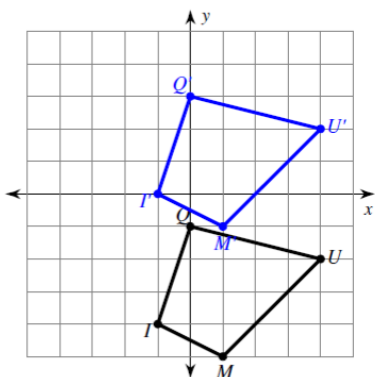
$J'(-5, 2), A'(-5, 4), N'(-1, 1)$

10) translation: 3 units right and 4 units up  
 $Z(-4, -3), I(-2, -2), V(-2, -4)$

$Z'(-1, 1), I'(1, 2), V'(1, 0)$

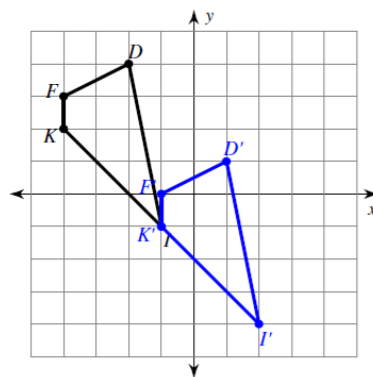
Write a rule to describe each transformation.

11)



translation: 4 units up

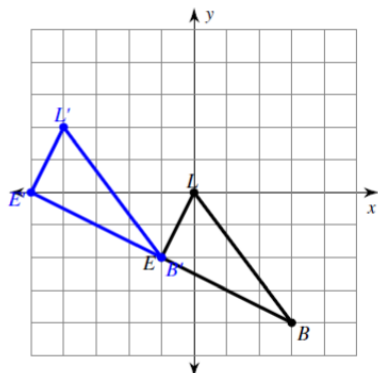
12)



translation: 3 units right and 3 units down

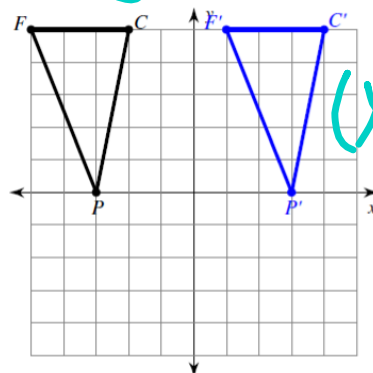
$$(x, y) \rightarrow (x+3, y-3)$$

13)



translation: 4 units left and 2 units up

14)



translation: 6 units right

$$(x+3, y-3)$$

## Arrow notation recap for translations

Move  $\triangle$  ABC 3 units right, 7 units down

$$(x, y) \rightarrow (x+3, y-7)$$

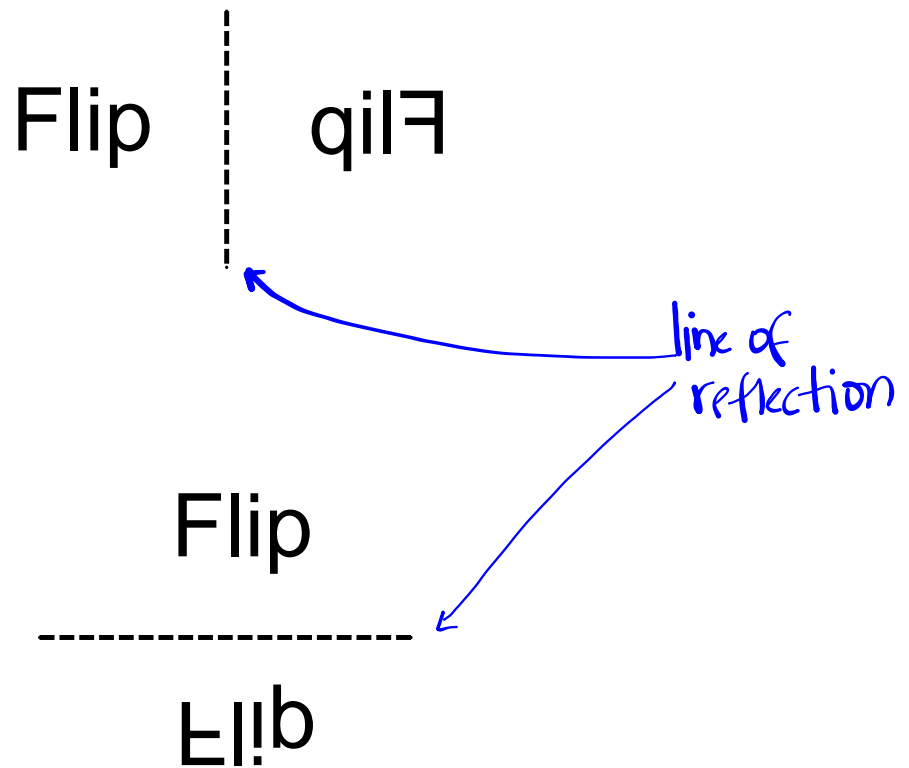
Move  $\triangle$  DEF 6 units left

$$(x, y) \rightarrow (x-6, y)$$

New transformation ...

**REFLECTION**  
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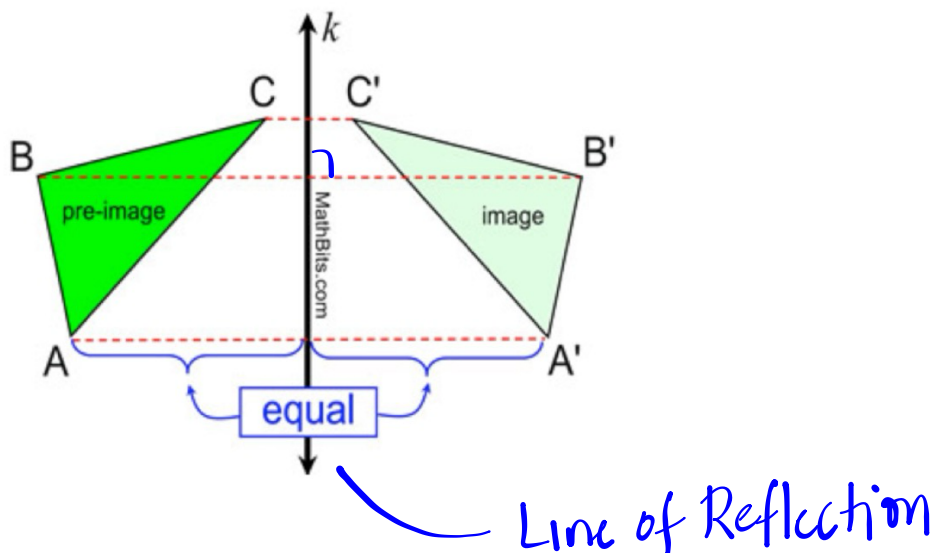
# Reflection



## Reflections - Notes

A **reflection** is a transformation which flips the figure over a line.

This line is called the Line of Reflection.



**Rules for Reflections:**

- Every point of the Image is moved to the other side of the line of reflection.
- Each point in the Image is the same distance from the line of reflection as the corresponding point in the preimage.
- The image is reflected at a 90° angle to the Line of Reflection.
- The image and the preimage are congruent.

**Example 1:**

$\triangle ABC$  is being reflected over the  $x$ -axis.

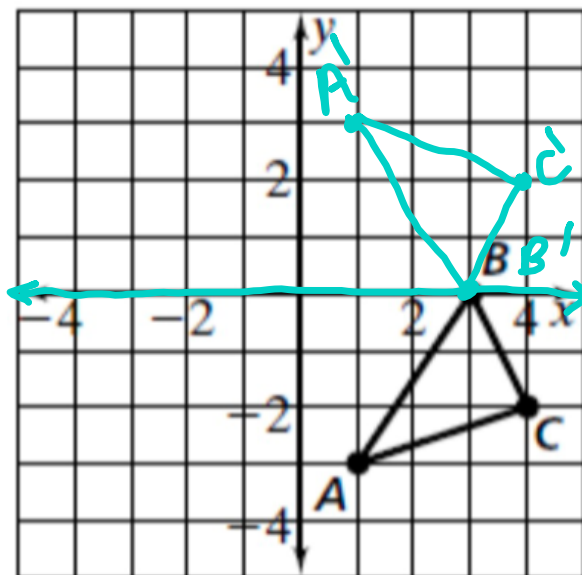
Draw and label the image  $\triangle A'B'C'$ .

What are the coordinates of:

$$A(1, -3) \rightarrow A'(1, 3)$$

$$B(3, 0) \rightarrow B'(3, 0)$$

$$C(4, -2) \rightarrow C'(4, 2)$$



Can you write a general rule for a reflection across the  $x$ -axis?

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

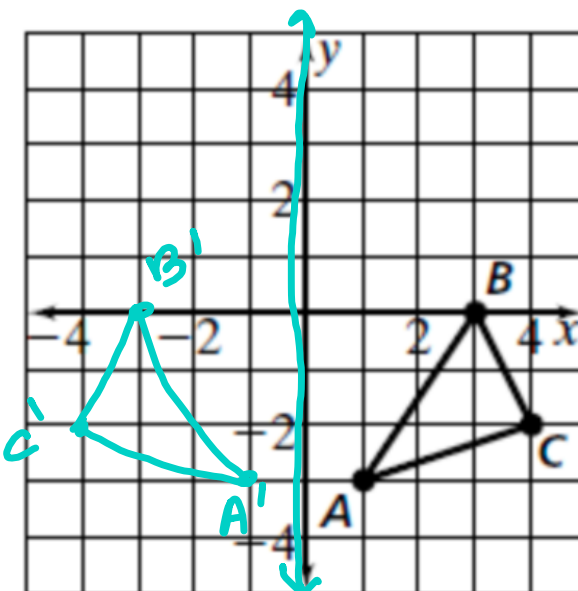
**Example 2:**

$\triangle ABC$  is reflected over the  $y$ -axis.

Draw the image  $\triangle A'B'C'$ .

What are the coordinates of:

$A$  (1, -3)  $\rightarrow$   $A'$  (-1, -3)  
 $B$  (3, 0)  $\rightarrow$   $B'$  (-3, 0)  
 $C$  (4, -2)  $\rightarrow$   $C'$  (-4, -2)



Write a general rule for a reflection over the  $y$ -axis:

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

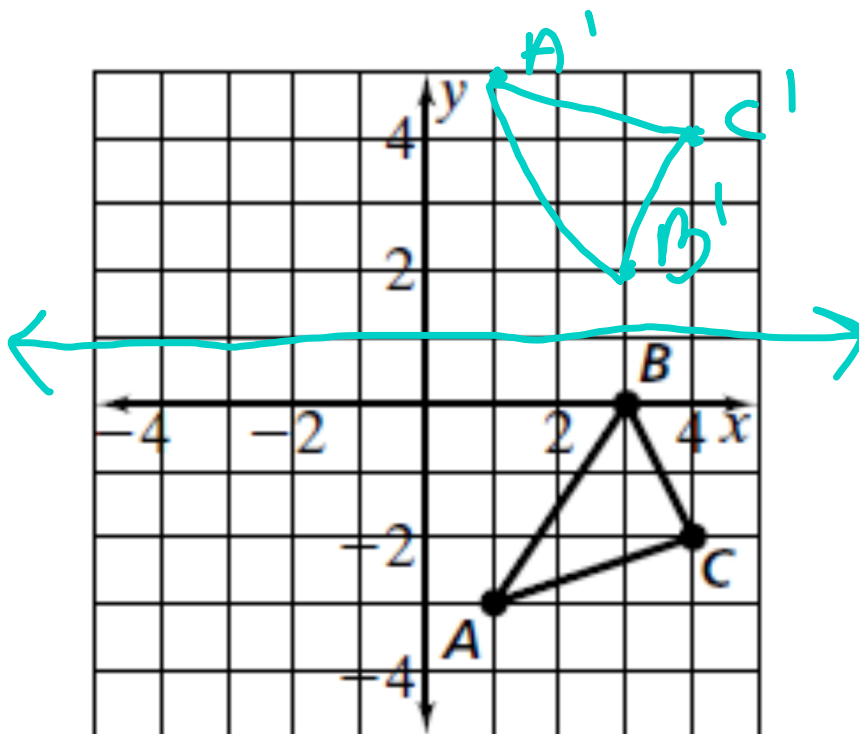
We can also reflect over a line that is not an axis.

**Example 3:**

$\triangle ABC$  is reflected over the line  $y = 1$ . Draw the image  $\triangle A'B'C'$ .

Steps to reflecting over a line that is not one of the axes:

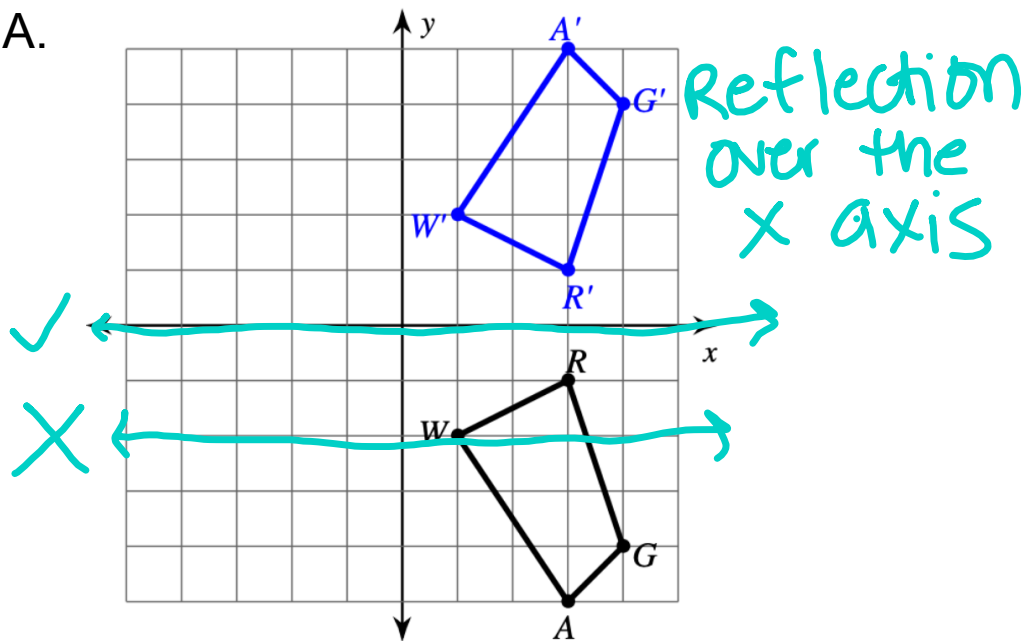
1. Draw your line of reflection on the graph
2. Move each point perpendicular **across** the line so that the new point is the same distance from the line of reflection as the original point.



**Example 4:**

Write the reflections that must have occurred.

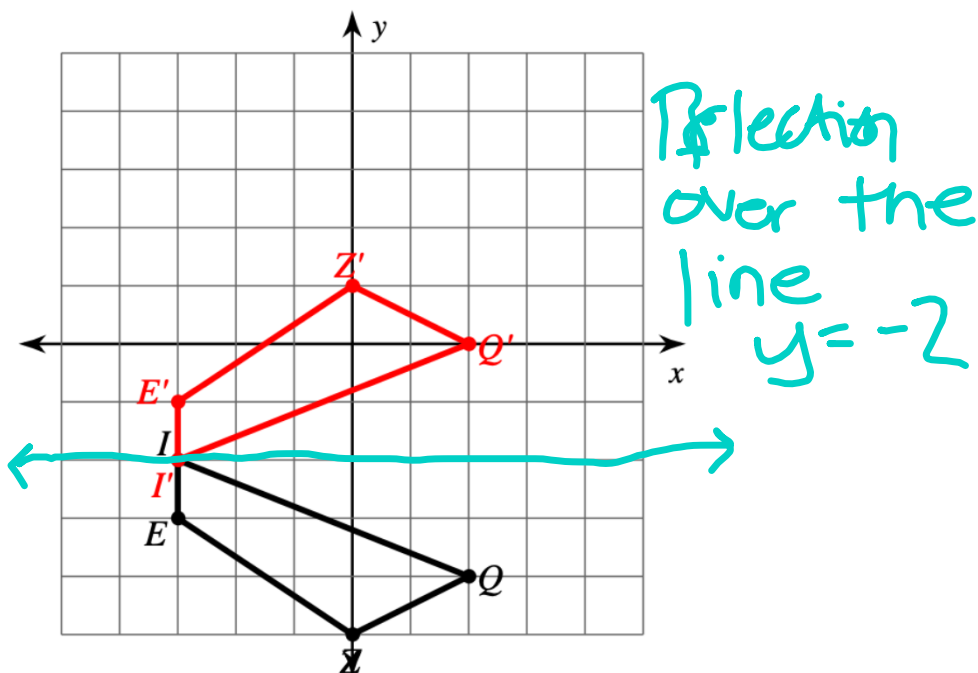
A.



**Example 4:**

Write the reflections that must have occurred.

B.



**Example 5:**

Write the reflection that must have occurred.

