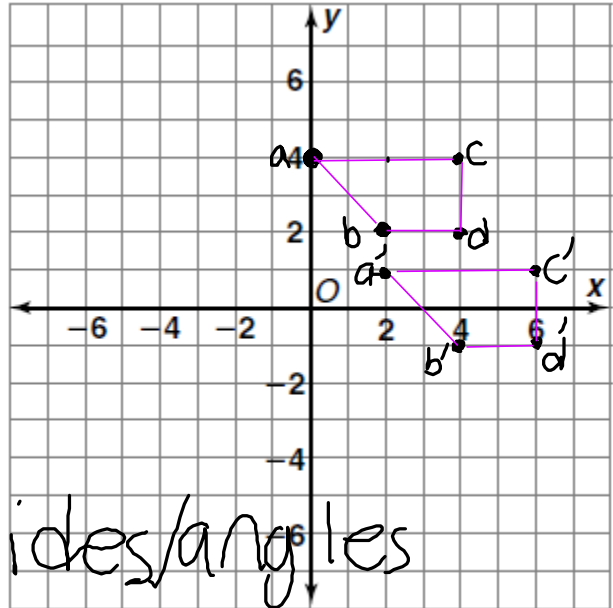**Name:** _____   **Date:** _____

M8-U2/3: Notes #9 – Reflections   **Class:** _____

WARM-UP:
Graph ABCD with vertices *A*(0, 4), *B*(2, 2), *C*(4, 2), and *D*(4, 4)
Graph the image *A'B'C'D'* after a translation using the rule $(x, y) \rightarrow (x + 2, y - 3)$.

Are there any geometric characteristics
which remained unchanged?
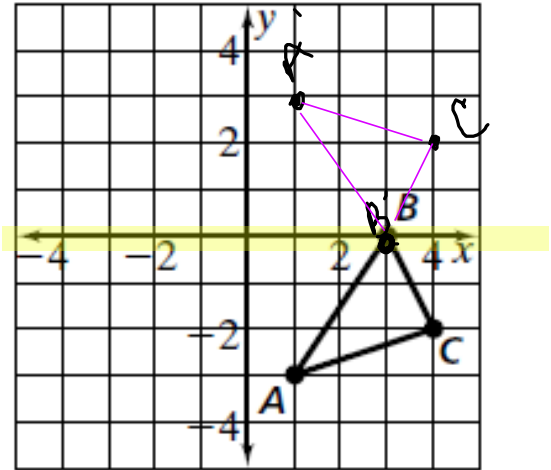
The shape
Cooresponding sides/angles
Perimiter

NOTES:
A **reflection** is a transformation which __flips__ the figure over a __line__.

This line is called the __line of symmetry__.

1

Example 1:
ΔABC is being reflected over the *x*-axis.

Draw and label the image *ΔA'B'C'*.

We can use an arrow to describe this reflection.

$$\Delta ABC \rightarrow \Delta A'B'C'$$

What are the coordinates of:

A __1, -3__ →   A' __1, 3__

B __3, 0__ →   B' __3, 0__

C __4, -2__ →   C' __4, 2__

How did the coordinates of *A* change to the coordinates of *A'*?

y-coordinate - switch the sign

x-coordinate - stayed the same

Tell me more about this figure, is it congruent or similar? Explain how you know.

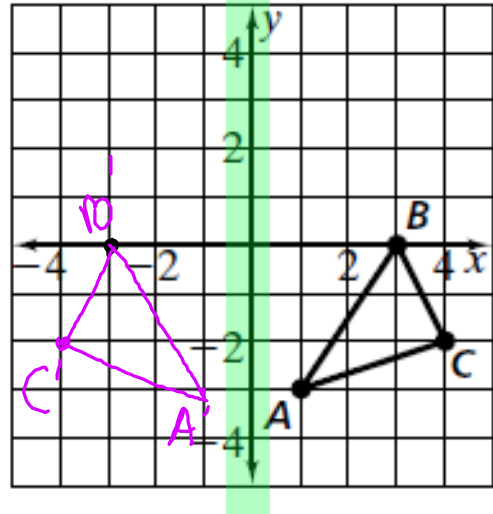Congruent - the corresponding angles and sides stayed the same

2

Example 2:

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

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

What are the coordinates of:

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

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

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

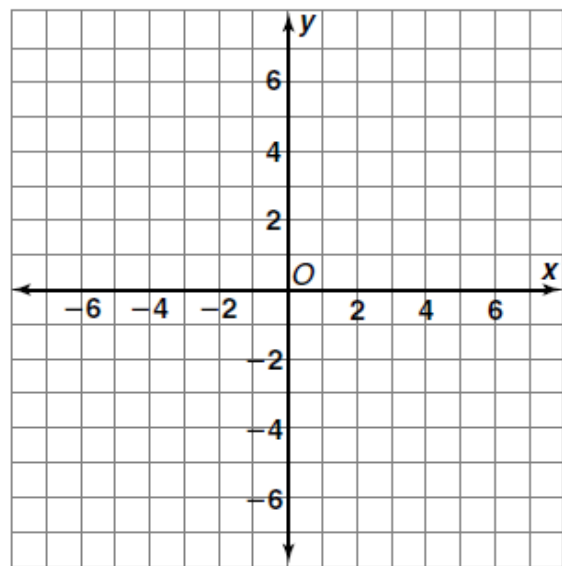How did the coordinates of *A* change to the coordinates of *A'*?

X-coordinate - switch to opposite sign
y-coordinate - stayed the same

Try it!

Graph *ABCD* with vertices *A*(0, 4), *B*(2, 2), *C*(4, 2), and *D*(4, 4).

Graph the image *A'B'C'D'* after a reflection over **the *y*-axis.**

How did the coordinates of *A* change to the coordinates of *A'*?

Try it!

a) Draw $\triangle JKL$ which has coordinates J (-2,0), K (-3,4), and L (5,-1).

b) Draw the image $\triangle J'K'L'$ after a reflection of $\triangle JKL$ over the **x-axis.**
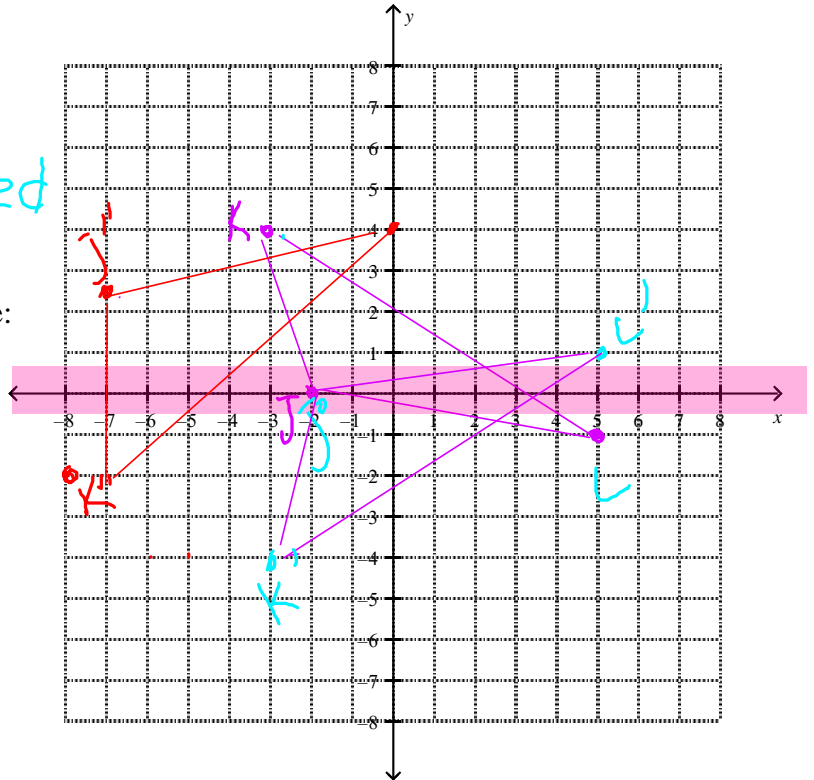
c) List the coordinates of $J'K'L'$.

J ___(-2,0)___ → J' _____

K ___(-3, 4)___ → K' _____

L ___(5, -1)___ → L' _____

d) How did the coordinates of K change to the coordinates of K'?

y-coordinate switched signs

e) Now translate $\triangle J'K'L'$ using the rule:
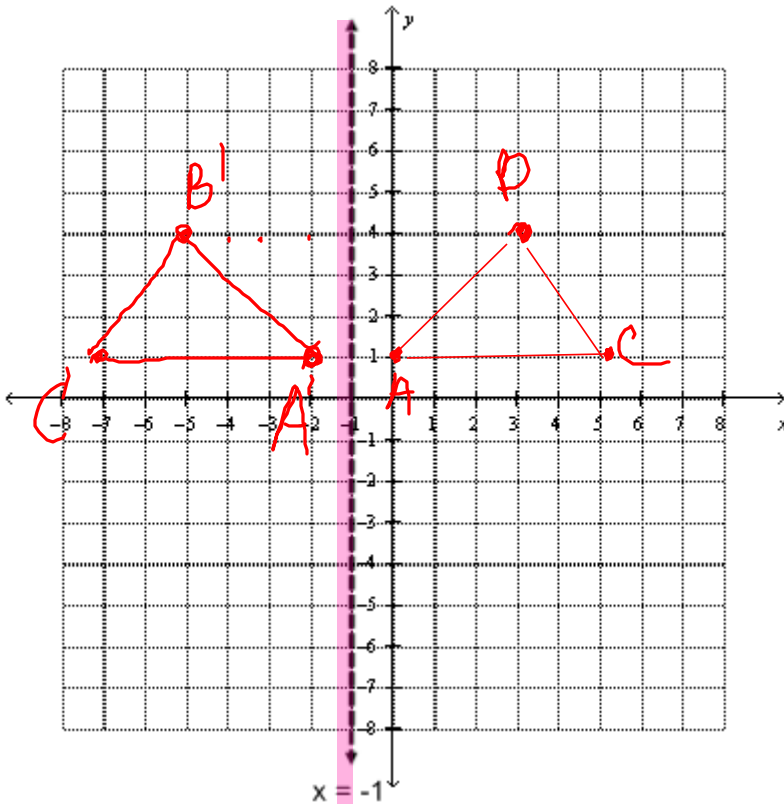
$(x, y) \rightarrow (x - 5, y + 3)$

4

Try it!

a) Draw $\triangle ABC$ which has coordinates $A(0,1)$, $B(3,4)$, and $C(5,1)$.

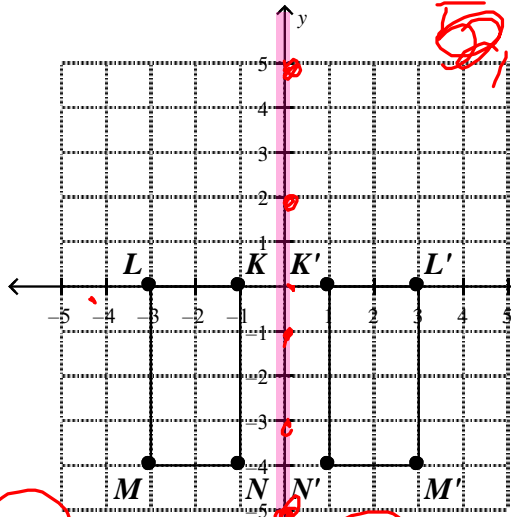b) Draw the image $\triangle A'B'C'$ after a reflection of $\triangle ABC$ over line $x = -1$

c) List the coordinates of $A'B'C'$.

A ___(0, 1)___ → A' ___(-2, 1)___

B ___(3, 4)___ → B' ___(-5, 4)___

C ___(5, 1)___ → C' ___(-7, 1)___

x = -1

Practice:

1. Draw the line of reflection which caused rectangle *KLMN* to reflect onto rectangle *K'L'M'N'*.
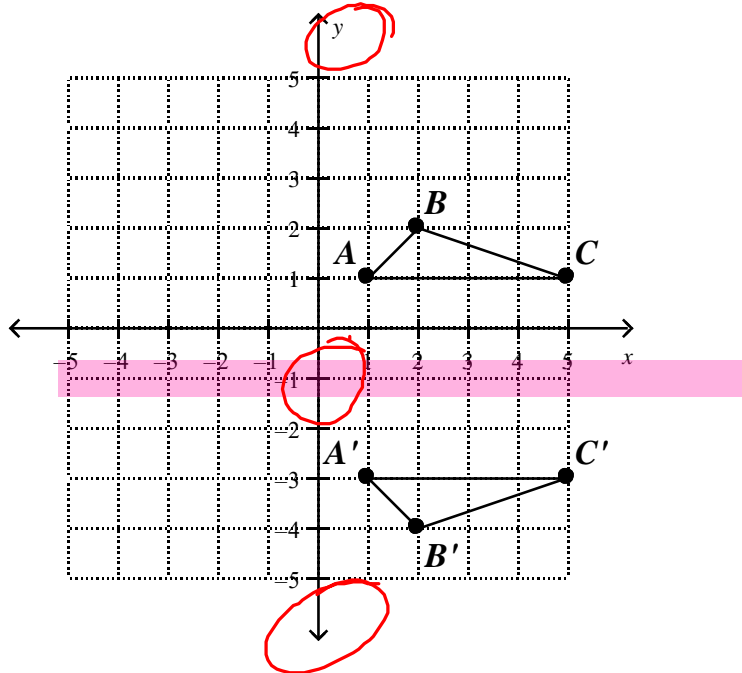   What is the equation of the line of reflection?

y-axis

x = 0

(0,-2)   (0,-5)

2. Draw the line of reflection which caused triangle *ABC* to reflect onto triangle *A'B'C'*.
   What is the equation of the line of reflection?

$y = -1$

3. Describe how you could move shape 2 to exactly match shape 2' by using one translation and one reflection.
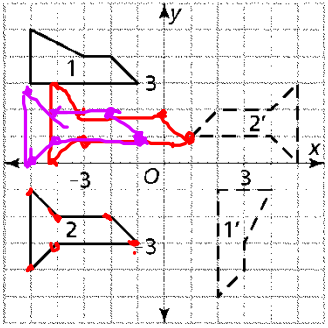
translate

$$\left(X+2, y+4\right)$$

Reflection $X=1$

$$\left(X, y+4\right) X=0$$

Reflection over Y-axis

4. Quadrilateral *CDEF* is plotted on the grid below.

On the graph, draw the reflection of polygon *CDEF* over the *x*-axis. Label the image *C'D'E'F'*.
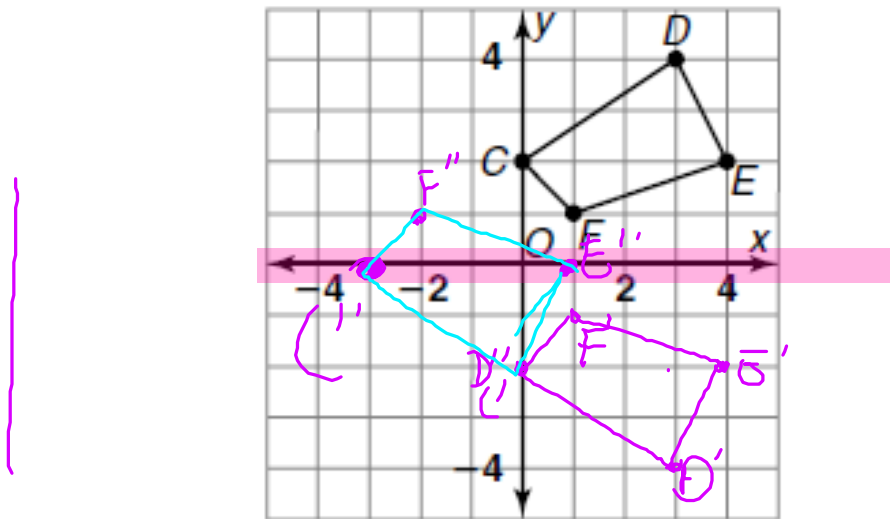
Now create polygon *C"D"E"F"* by translating polygon *C'D'E'F'* three units to the left and up two units. What will be the coordinates of point *C"*?

Answer $(-3, 0)$

5.

a) Draw △*JKL* which has coordinates *J* (–2,0), *K* (–3,4), and *L* (5, –1).

b) Draw the image △*J'K'L'* after a reflection of △*JKL* over the **y-axis.**

c) List the coordinates of *J'K'L'*.

    *J*___(–2,0)___ →   *J'* _____

    *K*___(–3, 4)___ →   *K'* _____

    *L*___(5, –1)___ →   *L'* _____

d) How did the coordinates of *K* change
  to the coordinates of *K''*?

e) Now translate △*J'K'L'* using the rule:

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

    Draw and label △*J''K''L''*
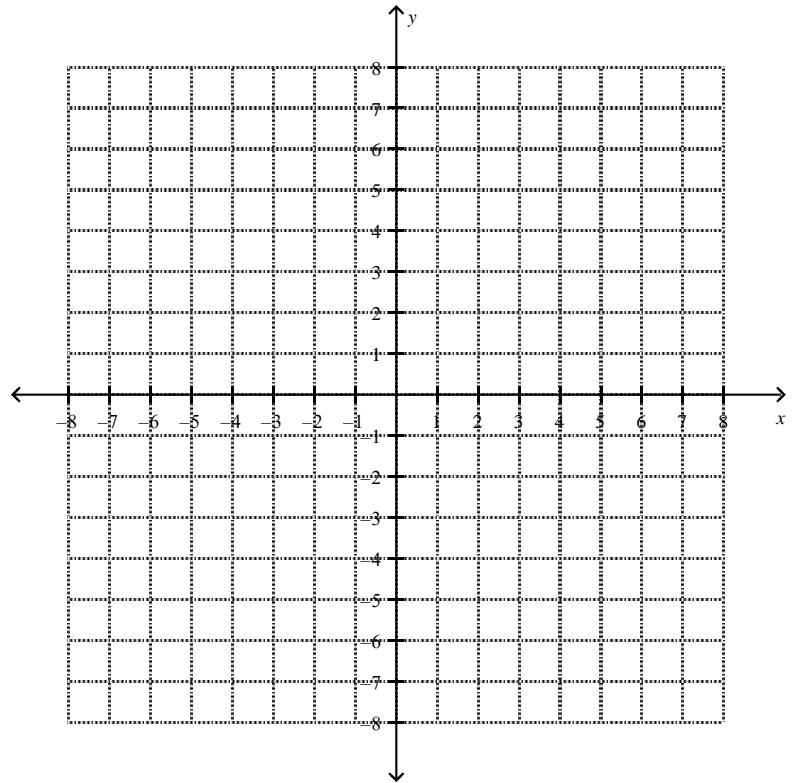
6.

a) Draw △*ABC* which has coordinates *A*(0,1), *B*(3,4), and *C*(5,1).

b) Draw the image △*A'B'C'* after a reflection of △*ABC* over $y = -2$.

c) List the coordinates of *A'B'C'*.

    A ___(0, 1)___   →   *A'* _____

    *B*___(3, 4)___   →   *B'* _____

    C ___(5, 1)___   →   *C'* _____

y = -2

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