

Name: Key

Date: _____

M8-U3: Notes #2 - Reflections

Class: _____

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

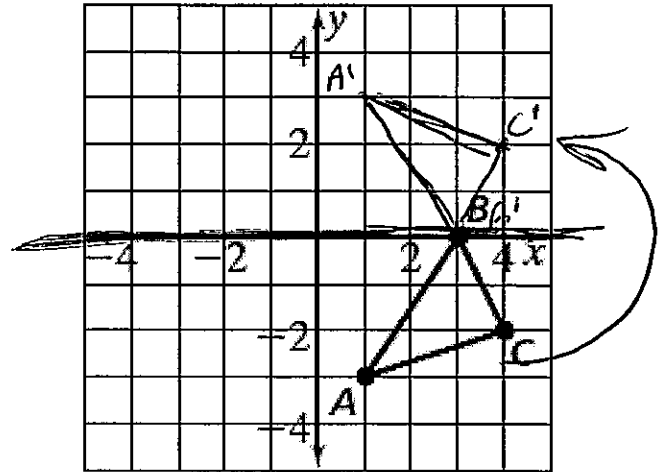
This line is called the line of reflection.

Example 1:

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

it must be equal distance away

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



We can use an arrow to describe this reflection.

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

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 an x -axis reflection:

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

means opposite

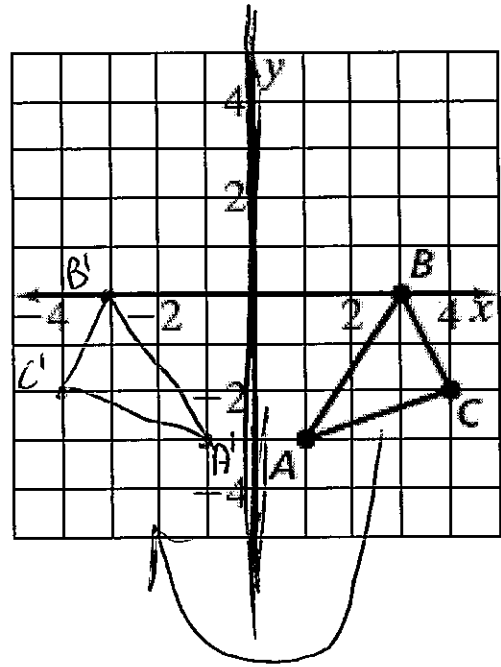
Tell me more about this figure, is it congruent or similar? Explain how you know.

same size and shape

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 y-axis reflection:

$$(x, y) \rightarrow \left(\underset{\uparrow}{-x}, y \right).$$

means
opposite

Example 3:

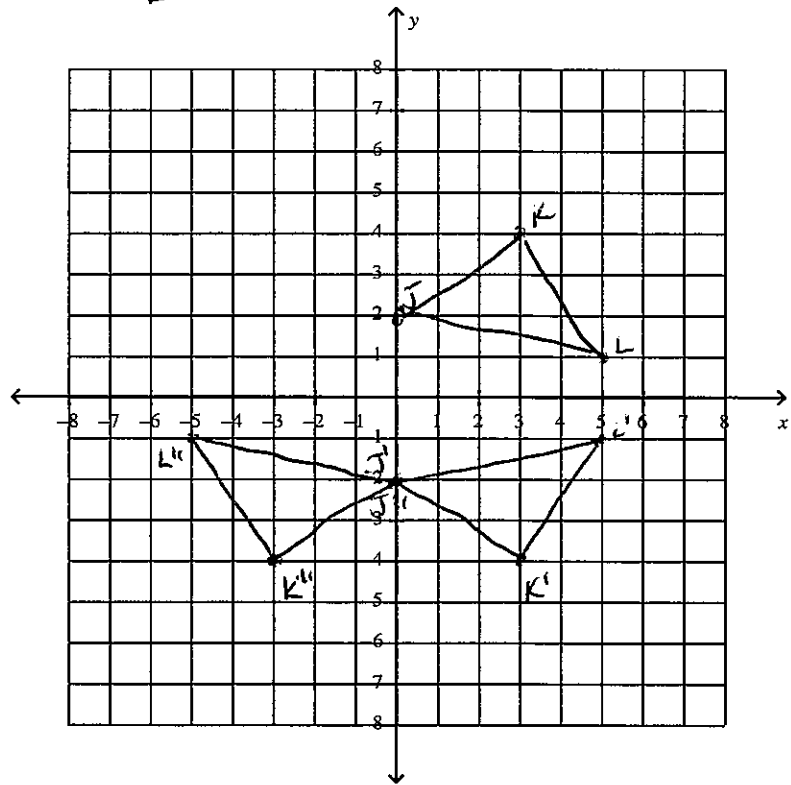
- a) Draw $\triangle JKL$ which has coordinates $J(0,2)$, $K(3,4)$, and $L(5,1)$.
 b) Draw the image $\triangle J'K'L'$ after a reflection of $\triangle JKL$ over the x-axis.
 c) List the coordinates of $J'K'L'$.

Hint: Change the y-value

$$J \underline{(0, 2)} \rightarrow J' \underline{(0, -2)}$$

$$K \underline{(3, 4)} \rightarrow K' \underline{(3, -4)}$$

$$L \underline{(5, 1)} \rightarrow L' \underline{(5, -1)}$$



- d) Draw the image $\triangle J''K''L''$ after a reflection of $\triangle J'K'L'$ over the y-axis.

Hint: Change the x-value

- e) List the coordinates of $J''K''L''$.

$$J' \underline{(\cancel{0}, -2)} \rightarrow J'' \underline{(0, -2)}$$

$$K' \underline{(\cancel{3}, -4)} \rightarrow K'' \underline{(-3, -4)}$$

$$L' \underline{(\cancel{5}, -1)} \rightarrow L'' \underline{(-5, -1)}$$

- f) Describe a different combination of two reflections that would move $\triangle JKL$ to $\triangle J''K''L''$.

reflect over y-axis and then over the x-axis

- g) Is this new image congruent or similar to the original figure?

$y=x$
 reflection rule
 $(x,y) \rightarrow (y,x)$

Example 4:

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 $x = -1$.

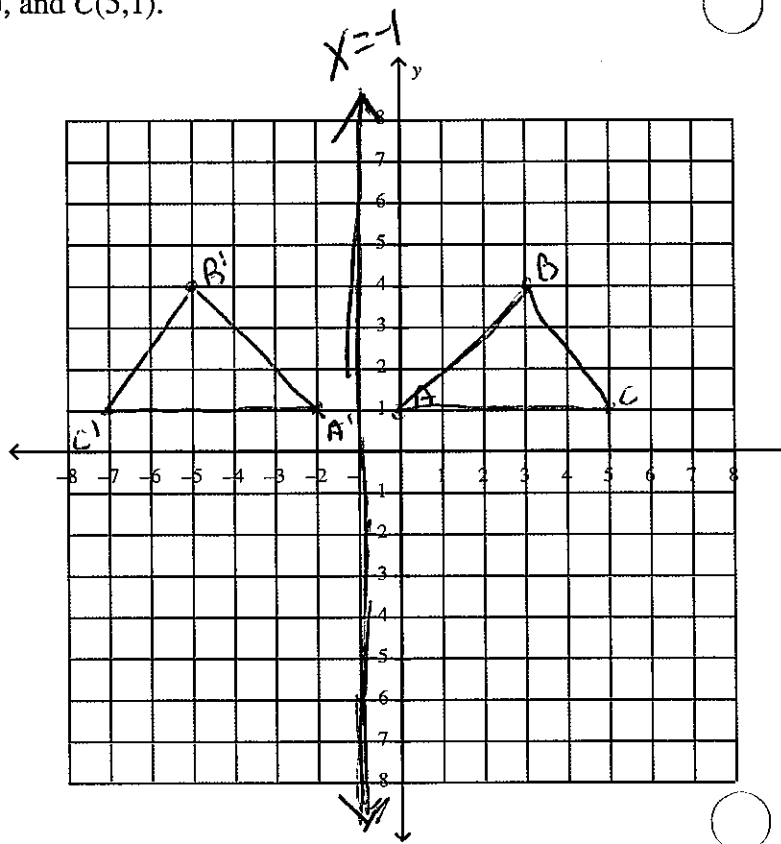
$x = -1$ vertical line
 Count, it makes it easier

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

A $(0, 1)$ \rightarrow A' $(-2, 1)$

B $(3, 4)$ \rightarrow B' $(-5, 4)$

C $(5, 1)$ \rightarrow C' $(-7, 1)$



Example 5:

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 $y = -2$.

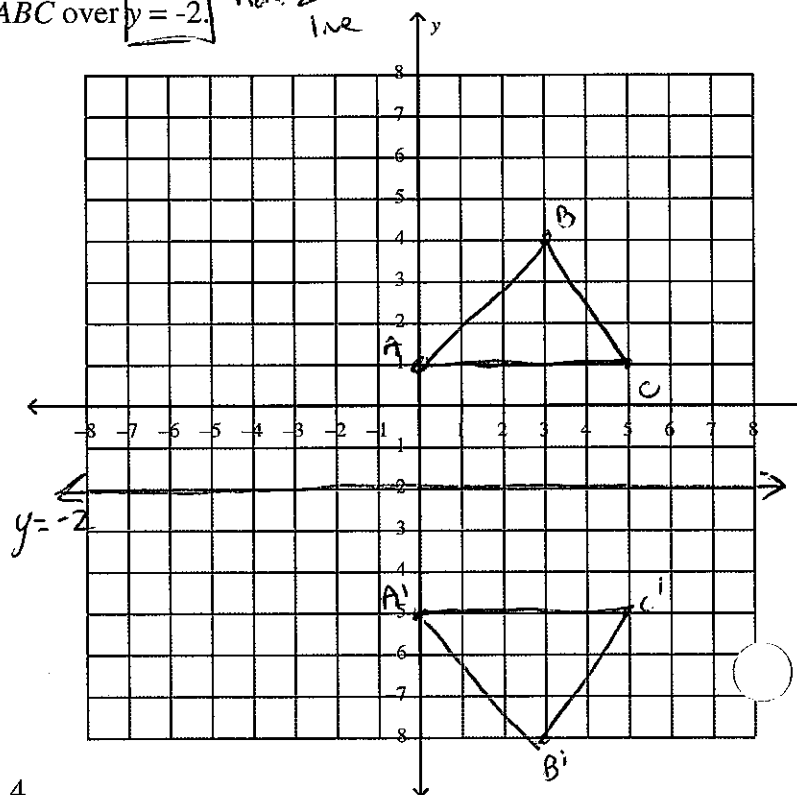
horizontal line

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

A $(0, 1)$ \rightarrow A' $(0, -5)$

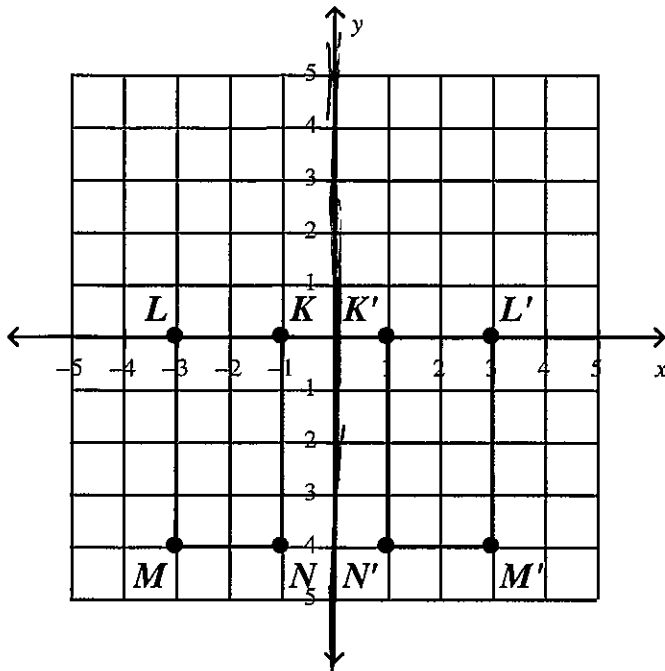
B $(3, 4)$ \rightarrow B' $(3, -8)$

C $(5, 1)$ \rightarrow C' $(5, -5)$



Example 6:

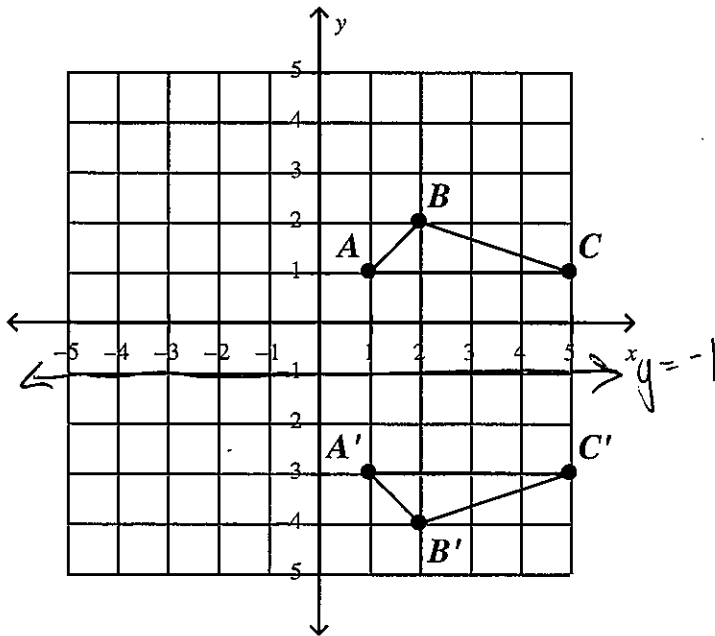
Draw the line of reflection which caused rectangle $KLMN$ to reflect onto rectangle $K'L'M'N'$. What is the equation of the line of reflection?



$y = ax + b$
or
 $x = 0$ line

Example 7:

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?

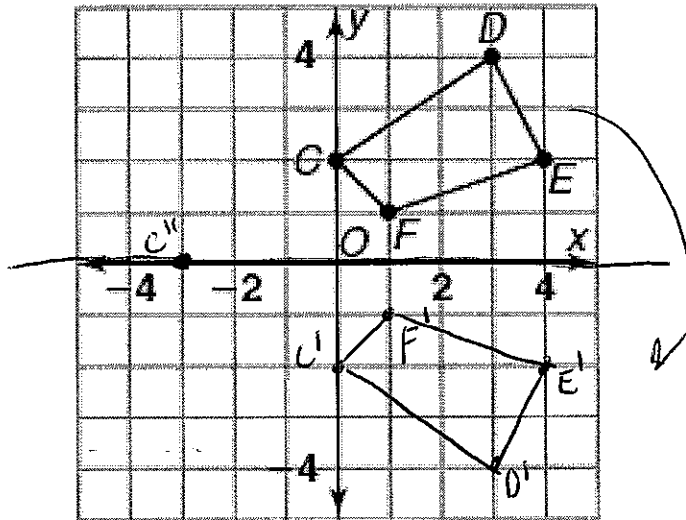


must be equal
distance away
So cut it in
half.

Example 8:

Quadrilateral $CDEF$ is plotted on the grid below.

On the graph, draw the reflection of polygon $CDEF$ over the x -axis. Label the image $C'D'E'F'$.

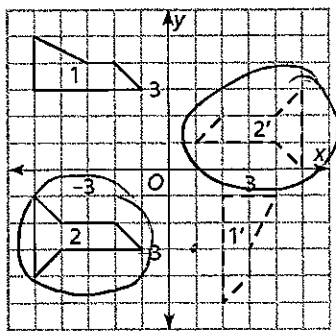


Now create polygon $C''D''E''F''$ by translating polygon $C'D'E'F'$ three units to the left and up two units. What will be the coordinates of point C'' ?

Answer $C''(-3, 0)$

Example 9:

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



Reflect then translate

y -axis reflection

then translate using the

$$\text{rule } (x, y) \rightarrow (x, y+4)$$

or

translate then reflect

translate using the rule $(x, y) \rightarrow (x, y+4)$

then reflect over the y -axis.