

# Geometry

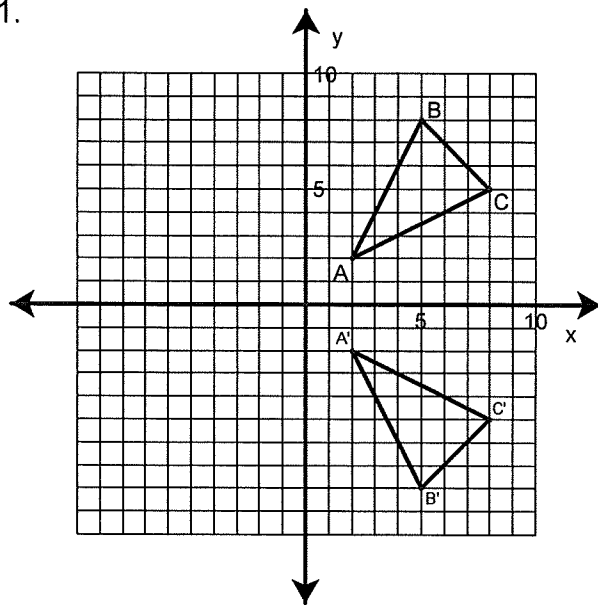
## Composite of Reflections over Two Intersecting Lines

Name \_\_\_\_\_

Hour \_\_\_\_\_

1 – 4 Find the line of reflection and highlight it with a colored pencil. Write the equation of the line of reflection. Find the coordinates of the reflected image and use them to write the image formula that would reflect any point  $(x,y)$  over the given reflection line.

1.



A	(2,2)	B	(5,8)	C	(8,5)
A'		B'		C'	

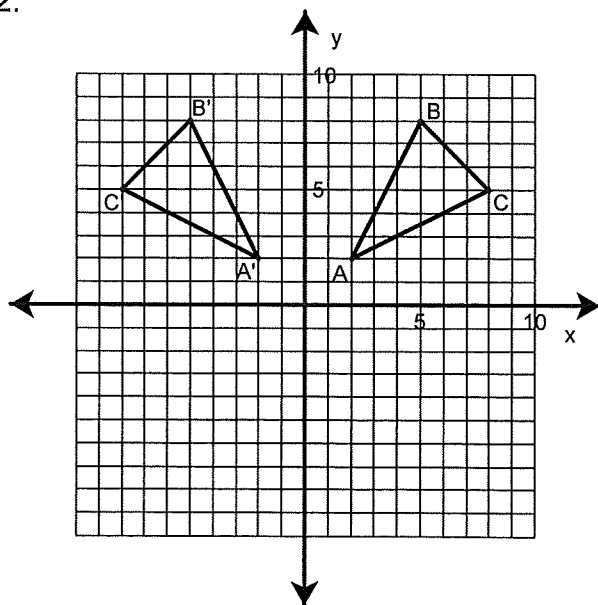
Equation of the line of reflection:

\_\_\_\_\_

Image formula for this reflection:

\_\_\_\_\_

2.



A	(2,2)	B	(5,8)	C	(8,5)
A'		B'		C'	

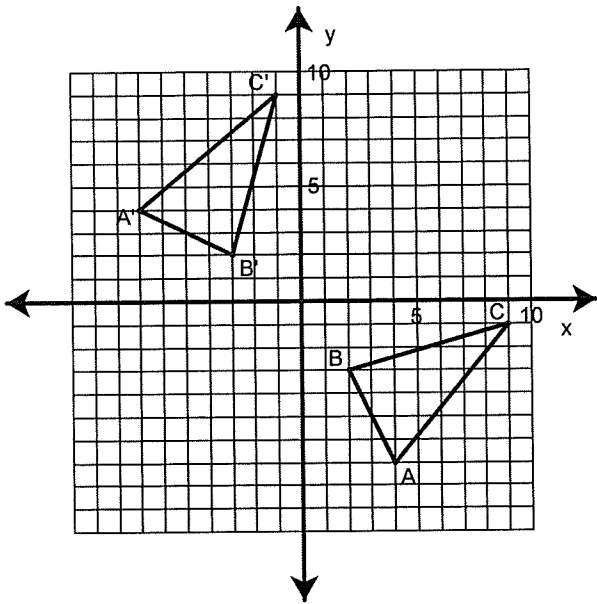
Equation of the line of reflection:

\_\_\_\_\_

Image formula for this reflection:

\_\_\_\_\_

3.



A	(4,-7)	B	(2,-3)	C	(9,-1)
A'		B'		C'	

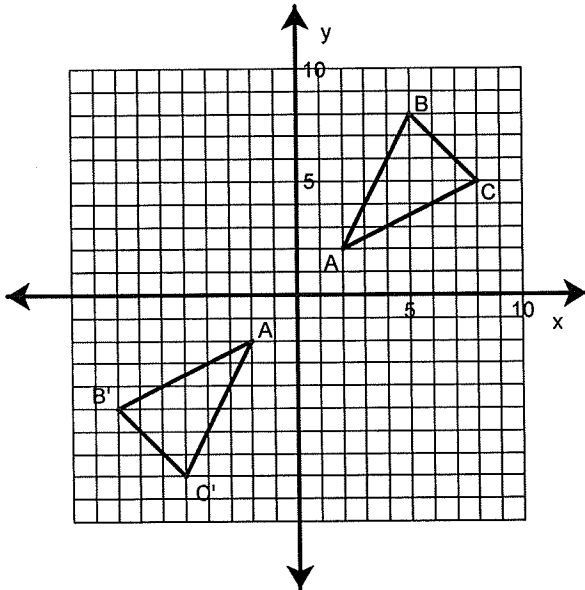
Equation of the line of reflection:

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Image formula for this reflection:

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4.



A	(2,2)	B	(5,8)	C	(8,5)
A'		B'		C'	

Equation of the line of reflection:

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Image formula for this reflection:

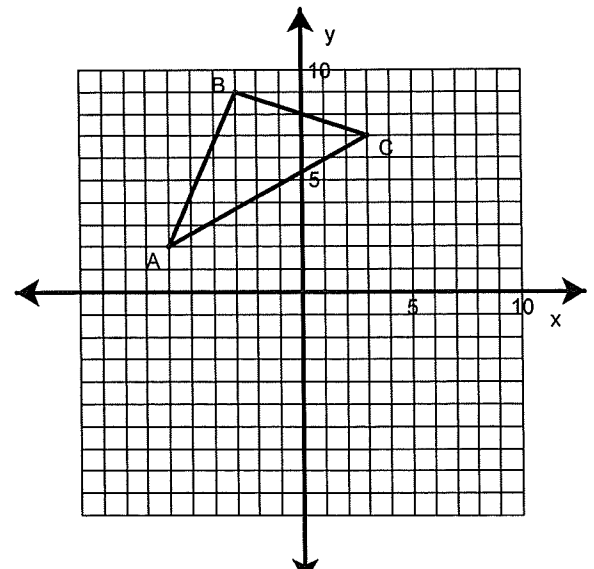
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5 – 6 Use the image formulas written in numbers 1 – 4 to find the new coordinates of  $\triangle ABC$ . Then graph the new triangle ( $\triangle A'B'C'$ ).

5. Equation of the line of reflection:  $y = x$

Image formula for this reflection: \_\_\_\_\_

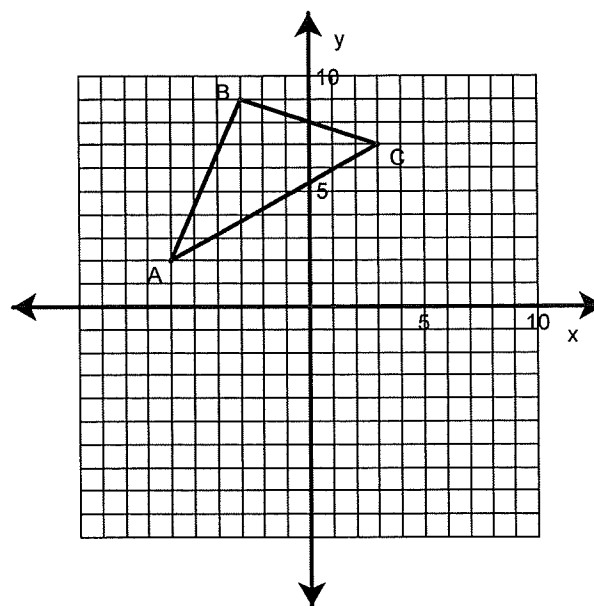
A	(-6,2)	B	(-3,9)	C	(3,7)
A'		B'		C'	



6. Equation of the line of reflection:  $y = -x$

Image formula for this reflection: \_\_\_\_\_

A	(-6,2)	B	(-3,9)	C	(3,7)
A'		B'		C'	



7 – 8 Use the image formulas written in numbers 1 – 4 to first find the coordinates of  $\Delta A'B'C'$  and then to find the coordinates of  $\Delta A''B''C''$  for the given composites. Then graph ONLY  $\Delta A''B''C''$ . Also graph the two lines of reflection.

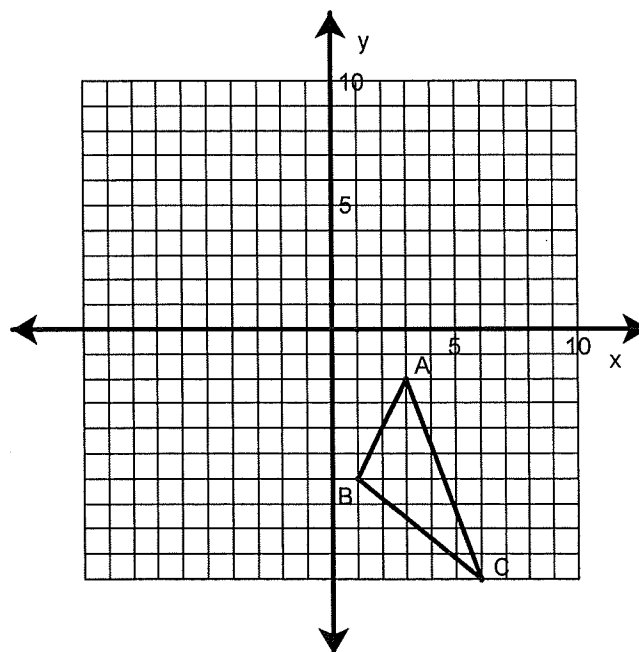
7. Composite:  $(r_{y=x} \circ r_{y=0})(\Delta ABC)$

Equation of the first line of reflection:  $y = 0$

Equation of the second line of reflection:  $y = x$

A	(3,-2)	B	(1,-6)	C	(6,-10)
A'		B'		C'	
A''		B''		C''	

What transformation occurred from this composite? In other words, what transformation would transform  $\Delta ABC$  to  $\Delta A''B''C''$  without using any reflections?



Give an image formula for this transformation.

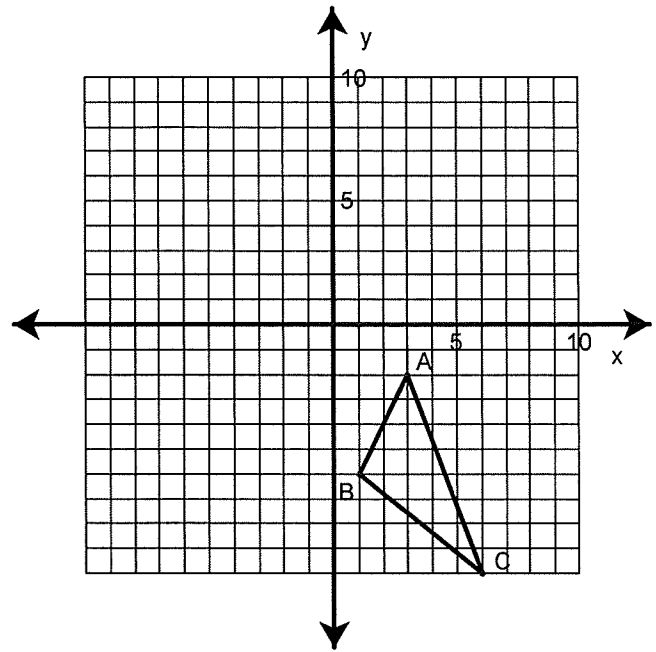
8. Composite:  $r_{y=0}(r_{y=x}(\triangle ABC))$

Equation of the first line of reflection:  $y = x$

Equation of the second line of reflection:  $y = 0$

A	(3,-2)	B	(1,-6)	C	(6,-10)
A'		B'		C'	
A''		B''		C''	

What transformation occurred from this composite? In other words, what transformation would transform  $\triangle ABC$  to  $\triangle A''B''C''$  without using any reflections?



Give an image formula for this transformation.

9. Notice in numbers 7 and 8, the same two lines of reflection were used, however the image triangle is located in a different position. Make a conjecture on what you think makes the difference.

10 - 11 Use the image formulas written in numbers 1 – 4 to first find the coordinates of  $\Delta A'B'C'$  and then to find the coordinates of  $\Delta A''B''C''$  for the given composites. Then graph ONLY  $\Delta A''B''C''$ .

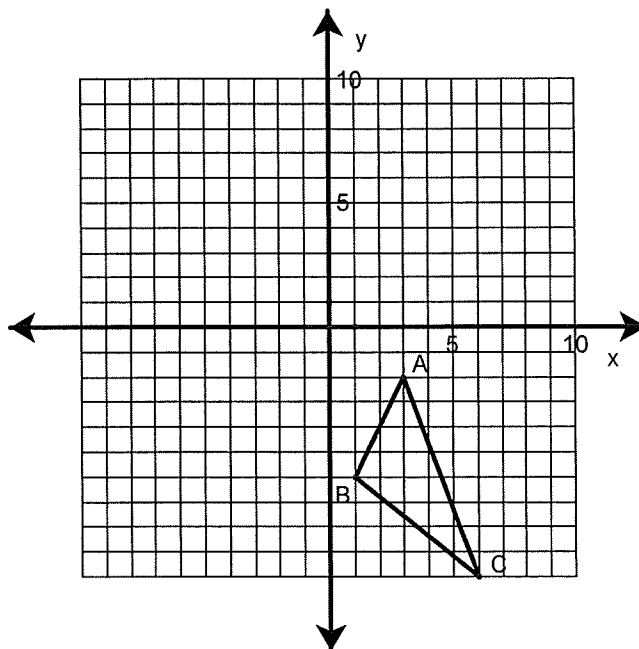
10. Composite:  $(r_{y=x} \circ r_{y=-x})(\Delta ABC)$

Equation of the first line of reflection: \_\_\_\_\_

Equation of the second line of reflection: \_\_\_\_\_

A	(3,-2)	B	(1,-6)	C	(6,-10)
A'		B'		C'	
A''		B''		C''	

What transformation occurred from this composite? In other words, what transformation would transform  $\Delta ABC$  to  $\Delta A''B''C''$  without using any reflections?



Give an image formula for this transformation.

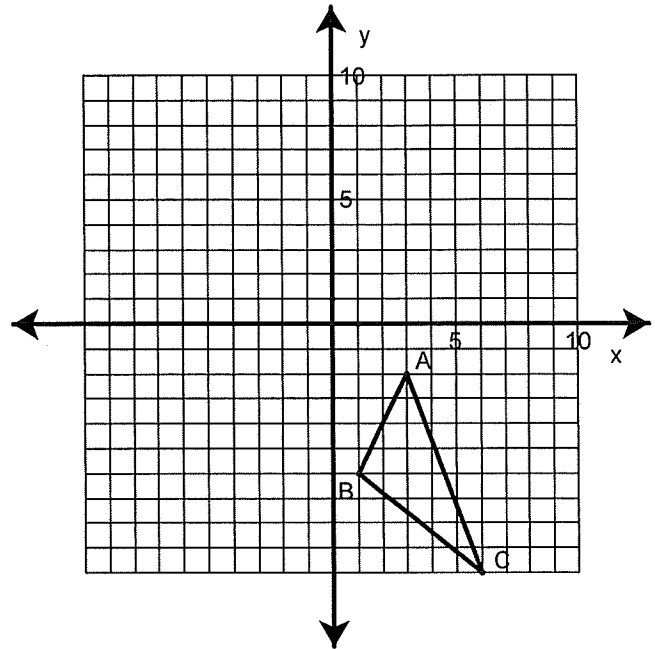
11 Composite:  $r_{x=0}(r_{y=0}(\triangle ABC))$

Equation of the first line of reflection: \_\_\_\_\_

Equation of the second line of reflection: \_\_\_\_\_

A	(3,-2)	B	(1,-6)	C	(6,-10)
A'		B'		C'	
A''		B''		C''	

What transformation occurred from this composite? In other words, what transformation would transform  $\triangle ABC$  to  $\triangle A''B''C''$  without using any reflections?

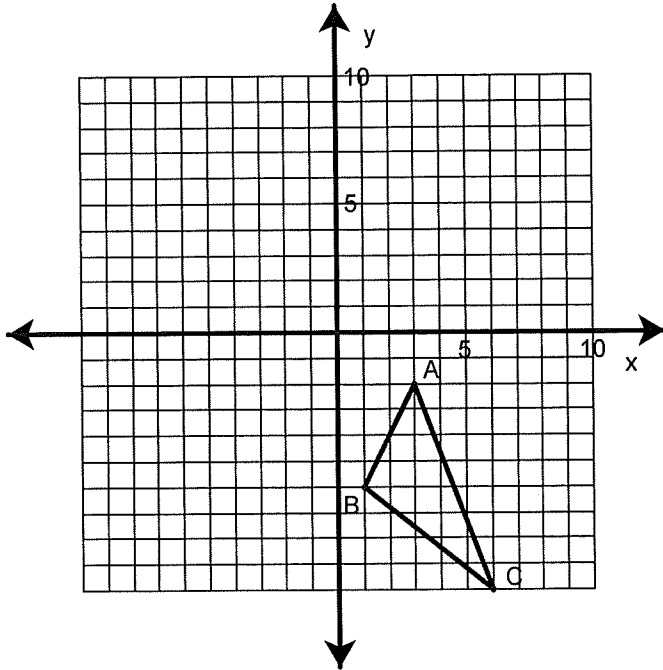


Give an image formula for this transformation.

12. Notice in numbers 10 and 11, the same transformation occurred but different lines were used. Make a conjecture on what you think must be true about the lines used as lines of reflection.

Extension:

- A. Find two lines of reflection that can be used to write a composite that will produce a  $90^\circ$  rotation of  $\triangle ABC$  with center  $(3,3)$  and write their equations.



- B. Find two lines of reflection that can be used to write a composite that will produce a  $-90^\circ$  rotation of  $\triangle ABC$  with center  $(2,-1)$  and write their equations.

