Geometry

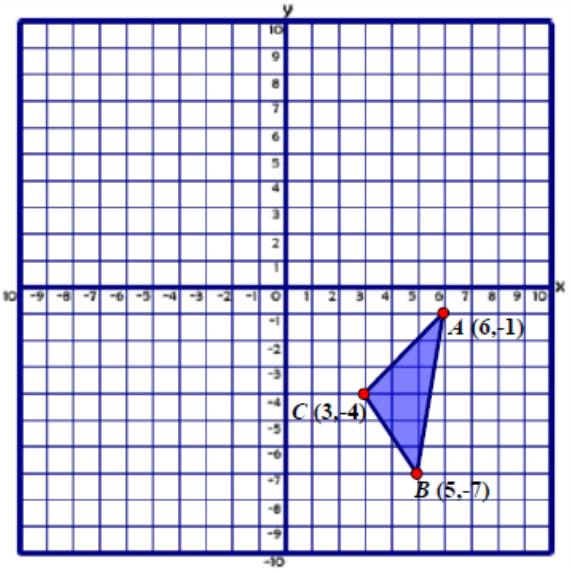
Name _____

Double Reflection over Parallel Lines

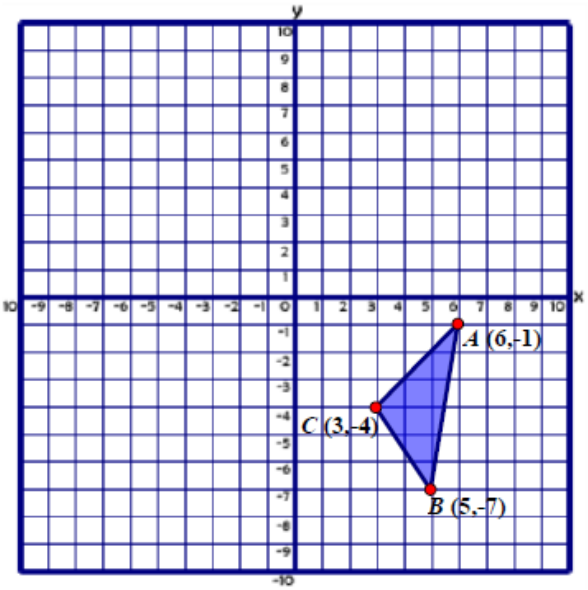
Date _____ Per_____

COMPOSITE TRANSFORMATIONS

1a) $T_{\langle -3,5 \rangle} \circ R_{y-axis}\ (\triangle ABC)$

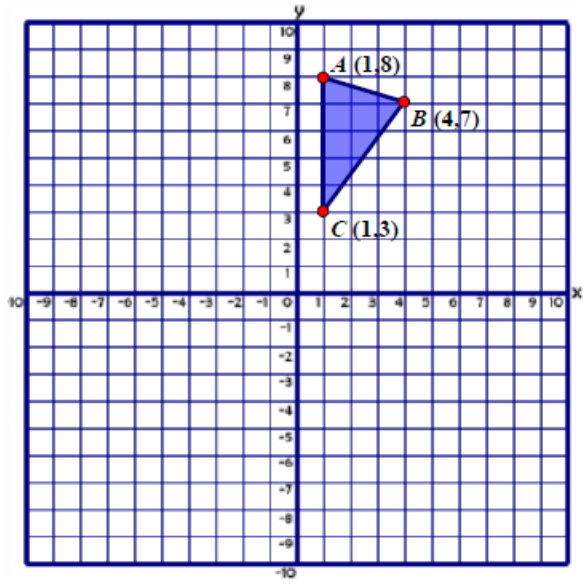


b) $R_{y-axis} \circ T_{\langle -3,5 \rangle}\ (\triangle ABC)$

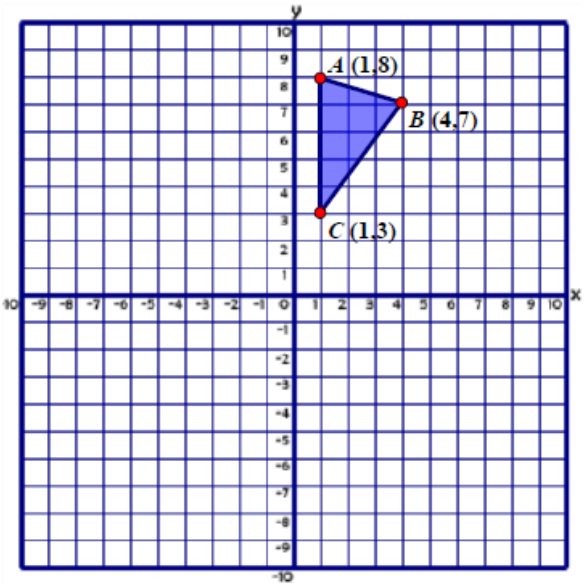


c) Did doing the transformations in a different order matter? Explain why?

2a) $R_{x-axis} \circ r_{90°,0}(\triangle ABC)$



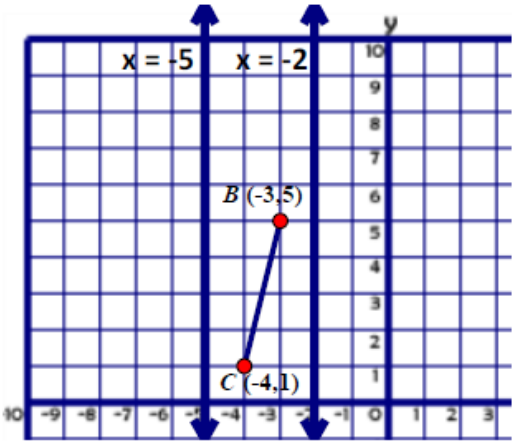
b) $r_{90°,0} \circ R_{x-axis}(\triangle ABC)$



c) Did doing the transformations in a different order matter? Explain why?

DOUBLE REFLECTIONS OVER PARALLEL LINES – Plot each of the stages of the composite transformation.

3a) $R_{x=-2} \circ R_{x=-5}(\overline{BC})$ (Reflection over x = -5 followed by a reflection over x = -2)



Circle the resultant transformation from $\overline{BC}$ *to* $\overline{B''C''}$

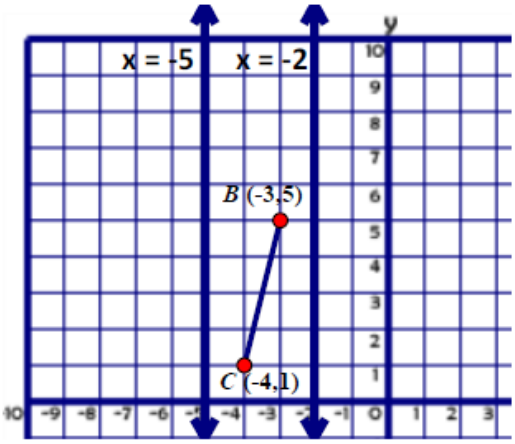
Rotation Reflection Translation

What is the distance BB''? _____

What is the distance between the parallel lines? ___

How do these two distances relate to each other?

b) $R_{x=-5} \circ R_{x=-2}(\overline{BC})$ (Reflection over x = -2 followed by a reflection over x = -5)



Circle the resultant transformation from $\overline{BC}$ *to* $\overline{B''C''}$

Rotation Reflection Translation

What is the distance BB''? _____

What is the distance between the parallel lines? ___

How do these two distances relate to each other?

CONJECTURE (Take a guess)

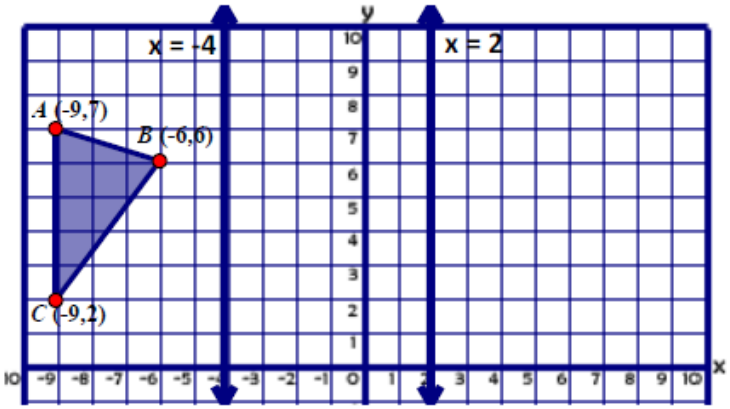
A **double reflection** over parallel lines seems to produce a _____ (type of transformation).

What is the relationship between the distance between the parallel lines and the total distance mapped by each point $(BB''or\ CC'')$?

The two examples above the only thing that changed was the order that we did the reflection in. What impact did the order have on the result?

DOES THE LOCATION OF THE SHPE DETERMINE THE DIRECTION IT MOVES?

4a) $R_{x=2} \circ R_{x=-4}\ (\triangle ABC)$ (Reflection over x = -4 followed by a reflection over x=2)



Circle the **resultant transformation** from ΔABC to ΔA''B''C''?

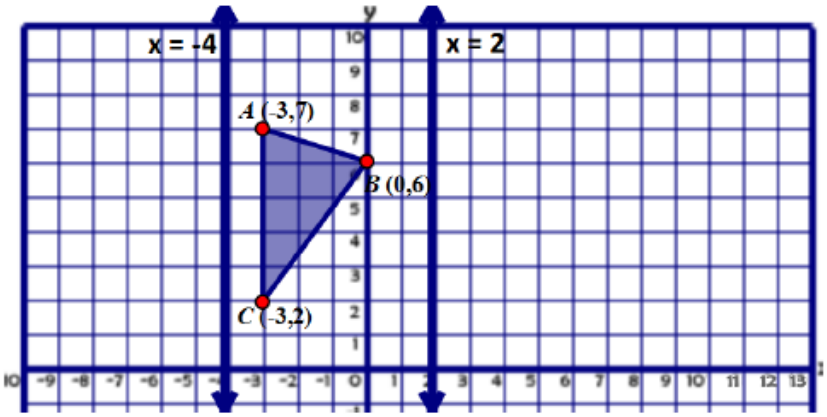
Rotation Reflection Translation

What is the distance CC''? _____

What is the distance between the parallel lines? _____

How do these two distances relate to each other?

4b) $R_{x=2} \circ R_{x=-4}\ (\triangle ABC)$ (Reflection over x = -4 followed by a reflection over x= 2)



Circle the **resultant transformation** from ΔABC to ΔA''B''C''?

Rotation Reflection Translation

What is the distance CC''? _____

What is the distance between the parallel lines? _____

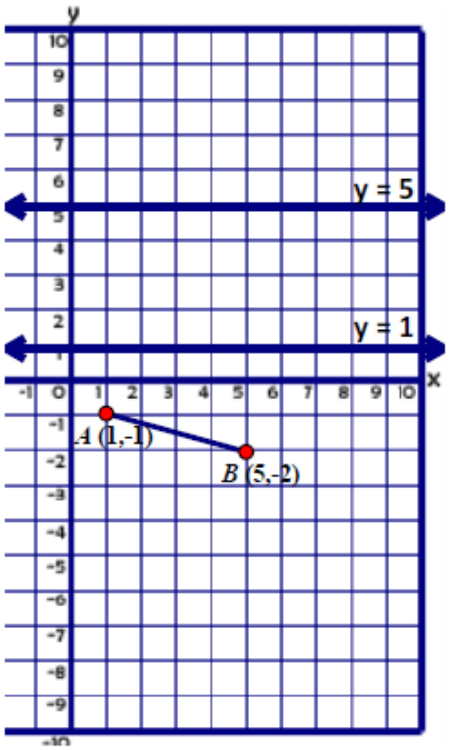
How do these two distances relate to each other?

CONJECTURE (Take a guess)

Looking back on the two examples, did the starting location of the shape alter the direction of the transformation?

What seems to be controlling the direction of the transformation?

5a) $R_{y=5} \circ R_{y=1}(\overline{AB})$ (Reflection over y = 1 followed by a reflection over y = 5)



Circle the **resultant** transformation from $\overline{AB}$ to $\overline{A"B"}$?

Rotation Reflection Translation

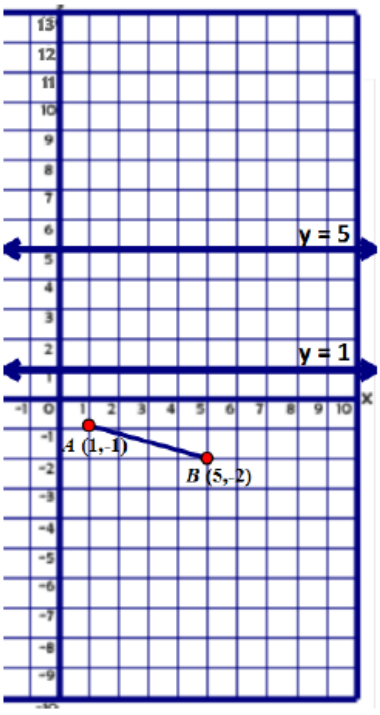
What is the distance BB''? _____

What is the distance between the parallel lines? _____

How do these two distances relate to each other?

What direction did the translation go? UP DOWN RIGHT LEFT

5b) $R_{y=1} \circ R_{y=5}(\overline{AB})$ (Reflection over y = 5 followed by a reflection over y = 1)



Circle the **resultant** transformation from $\overline{AB}$ to $\overline{A"B"}$?

Rotation Reflection Translation

What is the distance BB''? _____

What is the distance between the parallel lines? _____

How do these two distances relate to each other?

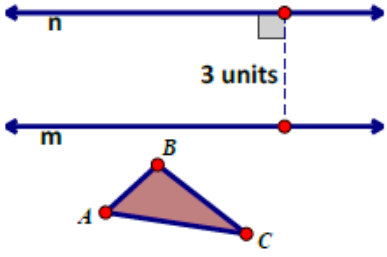
What direction did the translation go? UP DOWN RIGHT LEFT

CONJECTURE (Take a guess)

In the two examples, the only thing that changed was the order that we did the reflections. What impact did the order have on the result? How can you determine whether it will go up or down when reflecting over two horizontal lines?

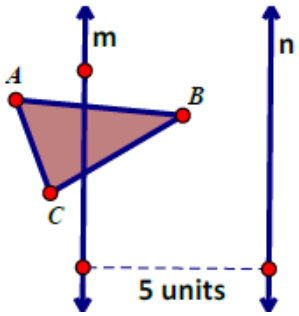
6. **Determine the translation distance and direction from the given information.**
(Lines that appear to be either horizontal or vertical are.)

a)



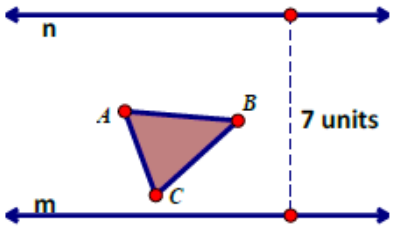
$R_n \circ R_m(\Delta ABC)$
Translation Distance = _____
Up Down Left Right

b)



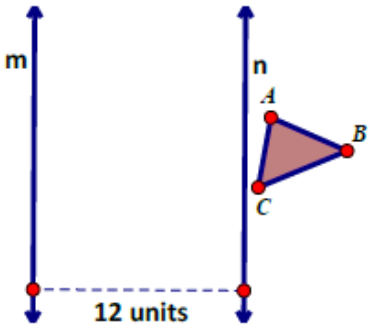
$R_n \circ R_m(\Delta ABC)$
Translation Distance = _____
Up Down Left Right

c)



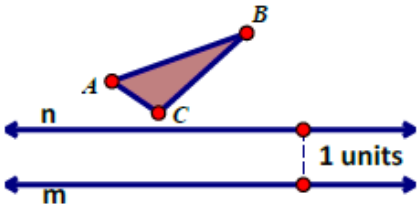
$R_n \circ R_m(\Delta ABC)$
Translation Distance
Up Down Left Right

d)



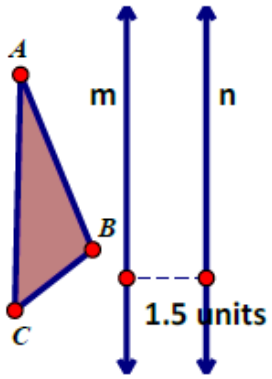
$R_m \circ R_n(\Delta ABC)$
Translation Distance = _____
Up Down Left Right

e)

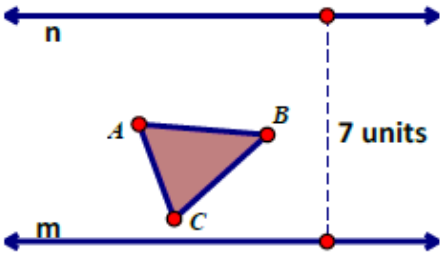


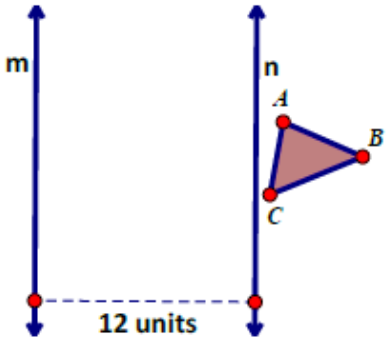
$R_m \circ R_n(\Delta ABC)$
Translation Distance = _____
Up Down Left Right

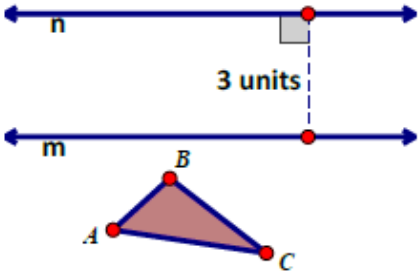
f)



$R_m \circ R_n(\Delta ABC)$
Translation Distance
Up Down Left Right







$R_m \circ R_n(\Delta ABC)$
Translation Distance = _____
Up Down Left Right

$R_n \circ R_m(\Delta ABC)$
Translation Distance = _____
Up Down Left Right

$R_m \circ R_n(\Delta ABC)$
Translation Distance
Up Down Left Right

7. Summary of relationships found in previous exercises.

a) Summarize why the order matters for two transformations.

b) A double reflection over two parallel lines results in a _____.

c) The distance of the translation is exactly _____ the distance between the parallel lines.

d) The direction of the translation depends on _____.

8. Complete the following

a) A reflection over x = 4 followed by a reflection over x = 9
results in a translation in the direction of UP DOWN RIGHT LEFT a total distance of _____.

b) A reflection over x = -1 followed by a reflection over x = -8
results in a translation in the direction of UP DOWN RIGHT LEFT a total distance of _____.

c) A reflection over y = 7 followed by a reflection over y = 3
results in a translation in the direction of UP DOWN RIGHT LEFT a total distance of _____.

d) A reflection over y = 1 followed by a reflection over y = 11
results in a translation in the direction of UP DOWN RIGHT LEFT a total distance of _____.

9. Complete the following

a) If you wanted to translate a shape to the right 10 units, you could reflect over x = 3 and then x = _____.

b) If you wanted to translate a shape to the left 4 units, you could reflect over x = 5 and then x = _____.

c) If you wanted to translate a shape up 6 units, you could reflect over y = -1 and then y = _____.

d) If you wanted to translate a shape down 1 units, you could reflect over y = 8 and then y = _____.

e) If you wanted to translate a shape to the right 6 units, you could reflect over x = _____ and then x = -4.

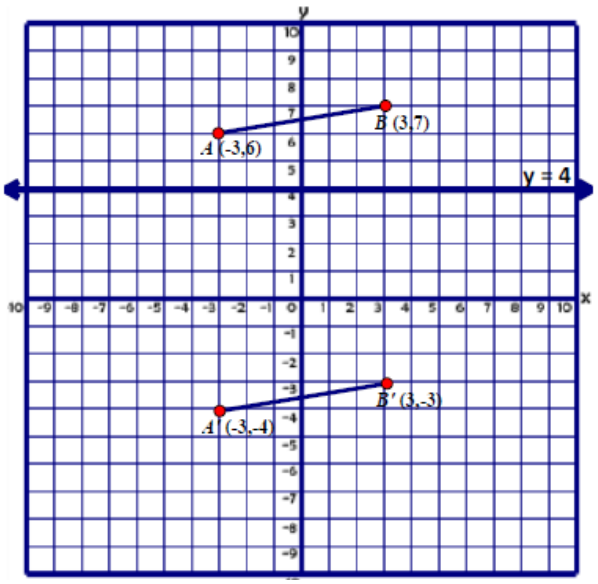
f) If you wanted to translate a shape to the left 12 units, you could reflect over x = _____ and then x = 1.

g) If you wanted to translate a shape up 4 units, you could reflect over y = _____ and then y = 2.

h) If you wanted to translate a shape down 7 units, you could reflect over y = _____ and then y = -2.5.

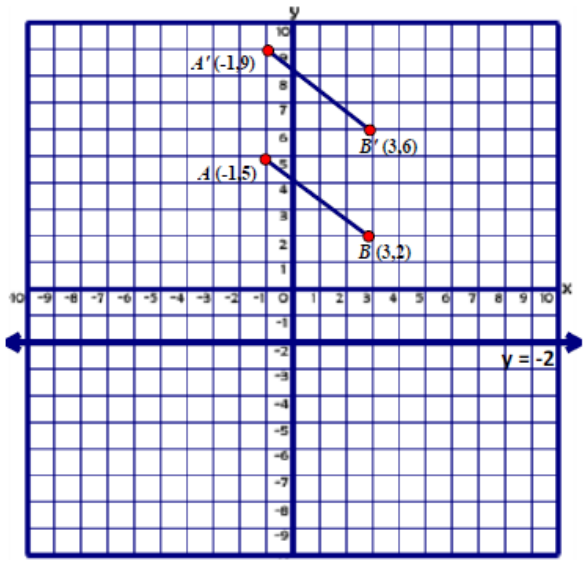
10. Determine the missing line of reflection. Draw it in and complete the composite statement.

a)



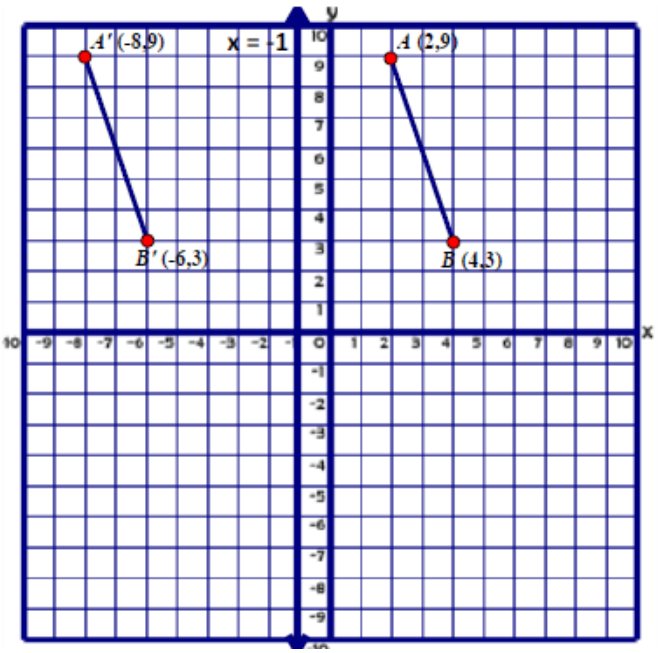
$R_{y=}$ ∘ $R_{y=4}(\overline{AB})$

b)



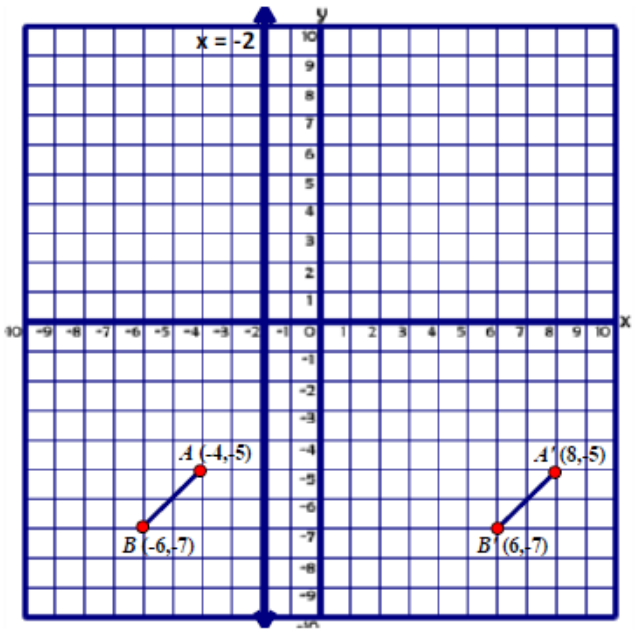
$R_{y=}$ ∘ $R_{y=-2}(\overline{AB})$

c)



$R_{x=} \circ R_{x=-1}(\overline{AB})$

d)



$R_{x=-2} \circ R_{x=}(\overline{AB})$