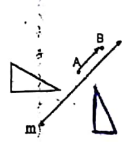
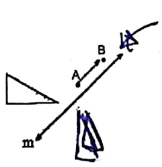
Special Kinds of Compositions!

Discovery Activity: Use patty paper to complete the transformations below:

1. Translate A→B, then reflect over line m



2. Reflect over line m, then translate A→B.



A→B is parallel to m

m = line of reflection

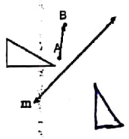
3. Does it matter which transformation is done first in a glide reflection?

NO the same new image.

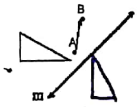
*"A **glide reflection** is the composition of a reflection and a translation where the translated motion is parallel to the line of reflection*

Use patty paper to complete the transformations below:

4. Translate A→B, then reflect over line m



5. Reflect over line m, then translate A→B.



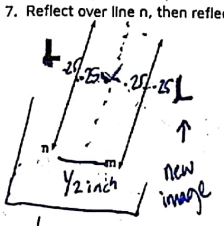
485 not the same new image.

6. Is this a glide reflection? Why or why not?

NO not a glide reflection the translation was not parallel to the line of reflection.

Use patty paper to complete the transformations below:

7. Reflect over line n, then reflect over line m.



Measure the distance from the preimage to the final image.

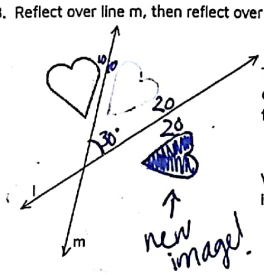
1 inch

Measure the distance from line n to line m.

½ inch

What can you conclude about consecutive reflections over parallel lines? Double the distance between parallel lines to tell NS translated distance

8. Reflect over line m, then reflect over line l.



The acute angle formed by line l and line m has a measure of 30°. Measure the angle of rotation (from the preimage to the final image)

60°C

What can you conclude about consecutive reflections over intersecting lines? Double the interior angle [formed by lines]

9. Two lines intersect at a 50° angle. Describe the composition of two reflections over the lines as a single transformation.

100° Rotation

10. Two parallel lines are 3 cm apart. Describe the composition of two reflections over the lines as a single transformation.

6cm Translation

11. A figure is reflected over the y-axis and then reflected over the line y = x. Write as a single transformation.

Rotation 90°C

12. The reflection $R_{x\text{-axis}}$ is followed by the reflection $R_{y\text{-axis}}$. Can this be written as a single reflection?

Can this be written as a single transformation? Draw a sketch to support your answer.

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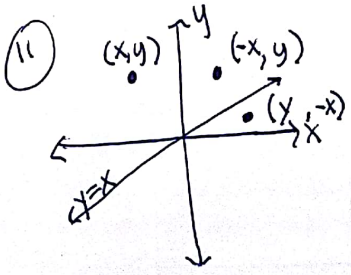

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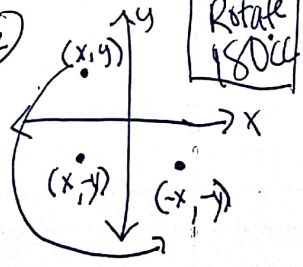

Rotate 180°CC

Name: _____

Writing Transformation Composition Rules

Directions: For each composition of transformations, complete the table by filling in any missing information. Then answer the discussion questions at the bottom of the page.
Hint: You may need a figure to graph and test for reversibility!

Food for First Thought: Compare these two composition rules. How are they different?

a) $(x,y) \to (-(x+1),y)$ $(x,y) \to (-x-1, y)$

b) $(x,y) \to (-x+1,y)$ $(x,y) \to (-x+1, y)$

	Composition	Description	Reversible? (Y or N)
1)	$(x,y) \to (-4x, 4y)$	Dilate by a factor of 4, then reflect over the y-axis	Yes!!
2)	$(x,y) \to (x, -y-5)$	Reflect over the x-axis, then translate down 5 units	No!!
3)	$(x,y) \to (-x, y-5)$	Reflect over the y-axis, then translate down 5 units	YES!!
4)	$(x,y) \to (\frac{1}{3}(x-2), \frac{1}{3}(y+1))$	Translate left 2 up 1 Dilate by 1/3	No!!
5)	$(x,y) \to (-(x+3), y-5)$ $(-x-3, y-5)$	Translate Right 3, down 5 Reflect over y-axis	No!!

Discussion Questions:

6) Summarize your observations. When are compositions reversible? Is there a pattern or a manner of predictability?

→ Be careful with translations.

7) Why do you think this is?

ORDER Matters

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(1) Reflect over the y-axis then Dilate by factor of 4.

$(x, y) \rightarrow (-4x, 4y)$

(2) Translate down 5 units, then Reflect over X-axis

$(x, y) \rightarrow (x, -(y-5))$

$(x, y) \rightarrow (x, -y+5)$

(4) Dilate by 1/3, then Translate left 2 Up 1

$(x, y) \rightarrow \left(\frac{1}{3}x-2, \frac{1}{3}y+1\right)$

(3) Translate Down 5 units, then reflect over the y-axis

$(x, y) \rightarrow (-x, y-5)$

(5) Reflect over the y-axis, Then translate Right 3, Down 5.

$(x, y) \rightarrow (-x+3, y-5)$