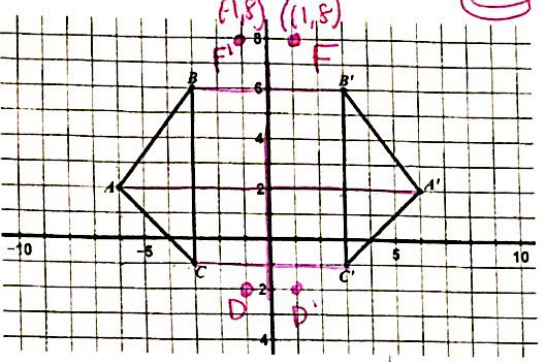
Name:_____ Date:_____ Per._____

U10 CWK #2 *Properties of Reflections*

1. In the grid below, ΔABC has been **reflected** over the *y*-axis to obtain $\Delta A'B'C'$.



a. Describe the movement of a figure that has been **reflected**.

backwards over y axis

b. In the table below, write the coordinates for the vertices of the pre-image and image.

Pre-Image	Image
A: (-6,2)	A': (6,2)
B: (-3,6)	B': (3,6)
C: (-3,-1)	C': (3,-1)

x is opposite(-) y stays same

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

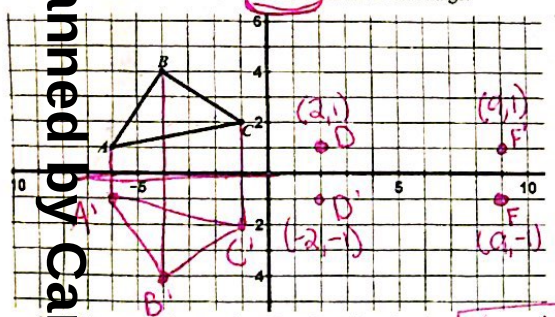
c. Write a coordinate rule to describe this reflection.

d. Will this coordinate rule hold true for any figure reflected over the *y*-axis? Why or why not?

yes.

Directions: Draw and label the image of each figure for the reflection given. Then, answer the questions.

2. Reflect ΔABC across the *x*-axis and label the image.



a. In the table below, write the coordinates for the vertices of the pre-image and image.

Pre-Image	Image
A: (-6,1)	A': (-6,-1)
B: (-4,4)	B': (-4,-4)
C: (-1,2)	C': (-1,-2)

x stays same y opposite (-)

b. Write a coordinate rule to describe this reflection.

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

c. Will this coordinate rule hold true for any figure reflected over the *x*-axis? Why or why not?

yes

line of reflection: where we could fold it in half.

3. Use questions #1 – 2 to explore some **properties of reflections**.

a. Go back to problem #1. Draw a segment connecting B and B', A and A', and C and C'. Make at least two conjectures about the relationship between **the line of reflection and the segments connecting corresponding vertices** in the image and pre-image of a reflection.

the line of reflection is halfway between

b. Do your conjectures hold true in problem #2?

yes

c. Go back to problem #1. For a *translation* we learned that corresponding segments are parallel (have the same slope). Is this property also true for reflections?

$\overline{AB}$ 4/3 $\Leftrightarrow$ $\overline{A'B'}$ -4/3 $\overline{AC}$ -3/3 -1 $\Leftrightarrow$ $\overline{A'C'}$ 3/3 =1

$\overline{BC}$: und 0 $\Leftrightarrow$ $\overline{B'C'}$: 0 und.

d. Now, go to problem #2. Find the slopes of the following segments:

$\overline{AB}$ = 3/2 $\overline{AC}$ = 1/5 $\overline{BC}$ = -2/3

$\overline{A'B'}$ = -3/2 $\overline{A'C'}$ = -1/5 $\overline{B'C'}$ = 2/3

e. Compare the slopes of the corresponding segments of the image and pre-image. What do you notice about the slopes? How does this connect to the coordinate rule $(x,y) \rightarrow (x,-y)$?

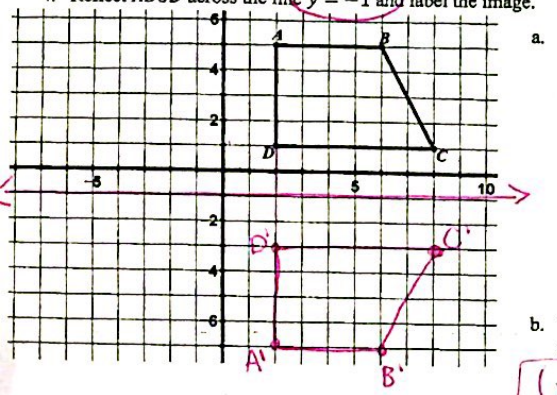
Slopes in reflections are - (or opposites)

f. Examine problems #1 and #2. What do you notice about the **lengths of corresponding segments** in the image and pre-image?

- lengths are the same.
- Same size shape
  - dif. orientation (backwards / upside down) 2

4. Reflect $ABCD$ across the line $y = -1$ and label the image.

→ where is $y = -1$?



a. In the table below, write the coordinates for the vertices of the pre-image and image.

Pre-Image	Image
A: (2, 5)	A': (2, −7)
B: (6, 5)	B': (6, −7)
C: (8, 1)	C': (8, −3)
D: (2, 1)	D': (2, −3)

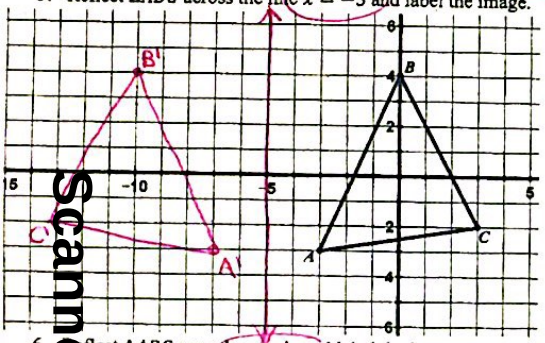
b. Write a coordinate rule to describe this reflection.

$(x, y) \rightarrow (x, -y - 2)$

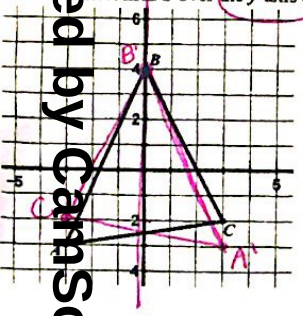
Double how far L.o.R. is from x-axis

Base reflection of horizontal L.o.R.

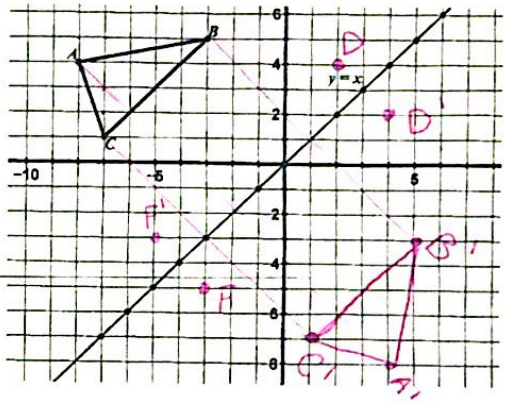
5. Reflect ΔABC across the line $x = -5$ and label the image.



6. Reflect ΔABC over the y-axis and label the image.



7. Reflect ΔABC across the line $y = x$ and label the image.



a. Describe the method you used to solve this problem.

How far from L.o.R.

b. In the table below, write the coordinates for the vertices of the pre-image and image.

Pre-Image	Image
A: (−8, 4)	A': (4, −8)
B: (−3, 5)	B': (5, −3)
C: (−7, 1)	C': (1, −7)

x & y switch

c. Write a coordinate rule to describe this reflection.

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

they are backwards

d. Will this coordinate rule hold true for any figure reflected over the line $y = x$? Why or why not?

D: (2, 4) ⇒ (4, 2) D' ✓

F: (−3, −5) ⇒ F': (−5, −3) ✓

e. Find the slopes of the following segments:

$\overline{AB} = 1/5$ $\overline{AC} = -3/1 = -3$ $\overline{BC} = \frac{4}{4} = 1$

$\overline{A'B'} = 5/1$ $\overline{A'C'} = -\frac{1}{3}$ $\overline{B'C'} = \frac{4}{4} = 1$

f. Compare the slopes of the corresponding segments of the image and pre-image. What do you notice? How does this connect to the coordinate rule?

Reciprocals

g. **Bonus:** What is the coordinate rule for a figure reflected across the line $y = -x$?