

Properties of Reflections

Use the graph for Exercises 1-3.

1. Quadrilateral J is reflected across the x -axis. What is the image of the reflection?

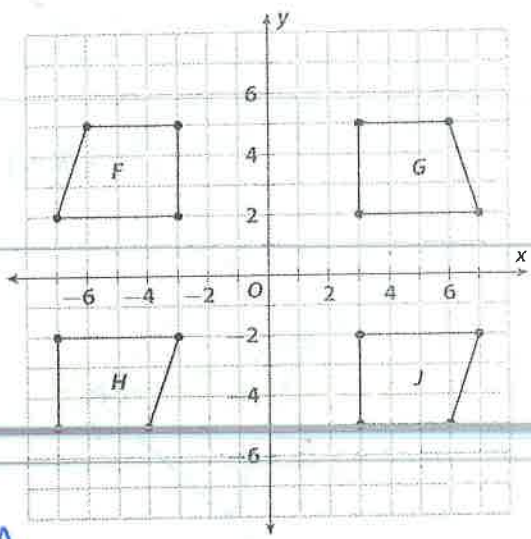
Quadrilateral G

2. Which two quadrilaterals are reflections of each other across the y -axis?

F & G

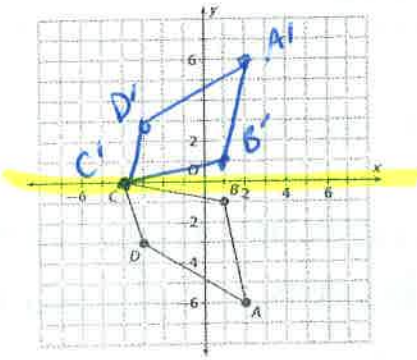
3. How are quadrilaterals H and J related?

They are translations - same shape, different location

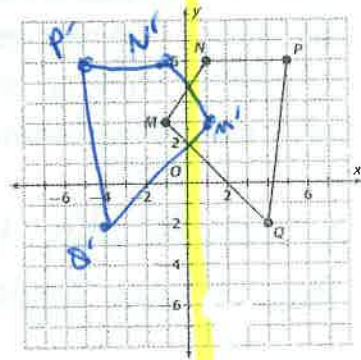


Draw the image of the figure after each reflection. Then write the algebraic rule for each reflection.

4. across the x -axis



5. across the y -axis



Algebraic rule:

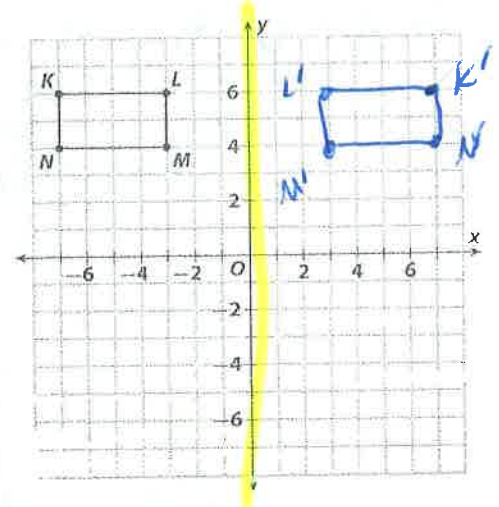
6. a. Graph rectangle $K'L'M'N'$, the image of rectangle $KLMN$ after a reflection across the y -axis.

- b. What is the perimeter of each rectangle?

12 units

- c. Is it possible for the perimeter of a figure to change after it is reflected? Explain.

No. The shape stays the same size when it is reflected.



Key

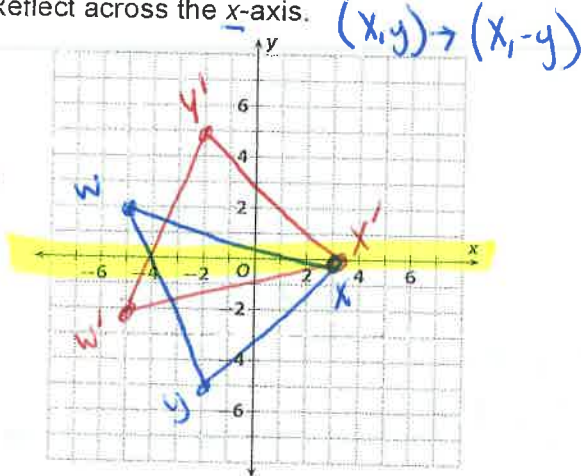
Properties of Reflections

The vertices of a figure are given. Draw the figure and its image after the described reflection. Then, write an algebraic rule to describe the reflection.

1. $W(-5, 2)$, $X(3, 0)$, $Y(-2, -5)$

Reflect across the x-axis.

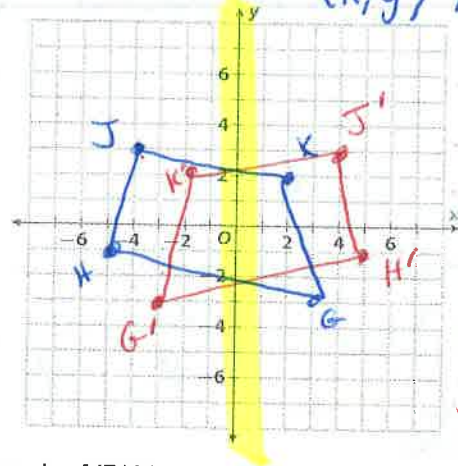
$W'(-5, -2)$
 $X'(3, 0)$
 $Y'(-2, 5)$



2. $G(3, -3)$, $H(-5, -1)$, $J(-4, 3)$, $K(2, 2)$

Reflect across the y-axis.

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



$G'(-3, -3)$
 $H'(5, -1)$
 $J'(4, 3)$
 $K'(-2, 2)$

3. Triangle ABC is reflected across the y-axis to form triangle A'B'C'. The coordinates of the vertices of the triangles are given below.

Triangle ABC: $A(2, 3)$ $B(6, 7)$ $C(4, 1)$
 Triangle A'B'C': $A'(-2, 3)$ $B'(-6, 7)$ $C'(-4, 1)$

Make a conjecture about the coordinates of a figure and its image after a reflection across the y-axis.

The x-coordinates become the opposite + y-coordinates stay the same after a reflection across the y-axis.

Draw the image of the given figure after the two transformations.

4. Translate 8 units right and 1 unit up.

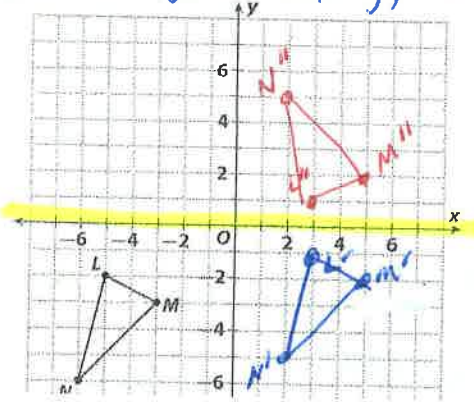
Algebraic rule for translation:

$(x, y) \rightarrow (x+8, y+1)$ L'M'N'

Reflect across the x-axis.

Algebraic rule for reflection:

$(x, y) \rightarrow (x, -y)$ L''M''N''



5. Reflect across the y-axis.

Algebraic rule for reflection:

$(x, y) \rightarrow (-x, y)$ Q'R'S'T'

Translate 2 units left and 5 units up.

Algebraic rule for translation:

$(x, y) \rightarrow (x-2, y+5)$ Q''R''S''T''

