Investigating Reflections

In this activity, you will use patty paper to search for specific patterns on the coordinate plane.

HABITS OF MIND
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Let's investigate reflecting across the *x*-axis.

› Place a sheet of patty paper over the coordinate plane and trace the axes.

1 For each ordered pair,
- Plot and label the point on patty paper.
- Fold the patty paper on the *x*-axis.
- Trace the point through the patty paper.
- Label the coordinates of the new point.

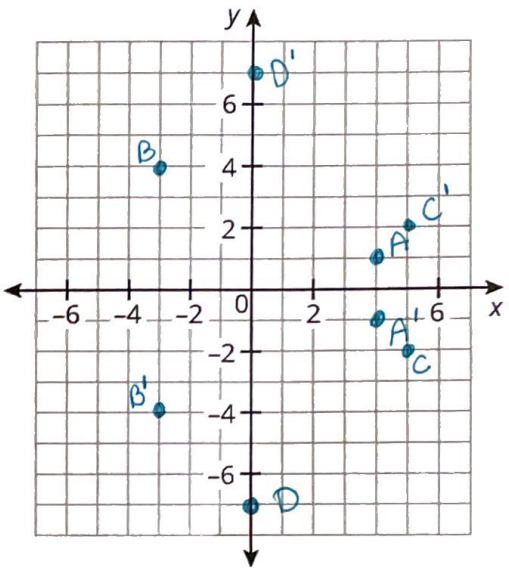
DID YOU KNOW?
A′ is read "A prime."

ⓐ *A* (4, 1) *A*′ (4, −1)

ⓑ *B* (−3, 4) *B*′ (−3, −4)

ⓒ *C* (5, −2) *C*′ (5, 2)

ⓓ *D* (0, −7) *D*′ (0, 7)



2 What did you notice about the coordinates of the original points and their reflections? **Write a generalization for the relationship between the coordinates of a point and its reflection across the *x*-axis.**

The x coordinate stays the same but the y coordinate is it opposite in the reflected point
* you are moving up & down (y ~~axis~~ coordinate changes) not right or left

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

Now let's investigate reflecting across the *y*-axis.

› Place a new sheet of patty paper over the coordinate plane and trace the axes.

3 For each ordered pair,

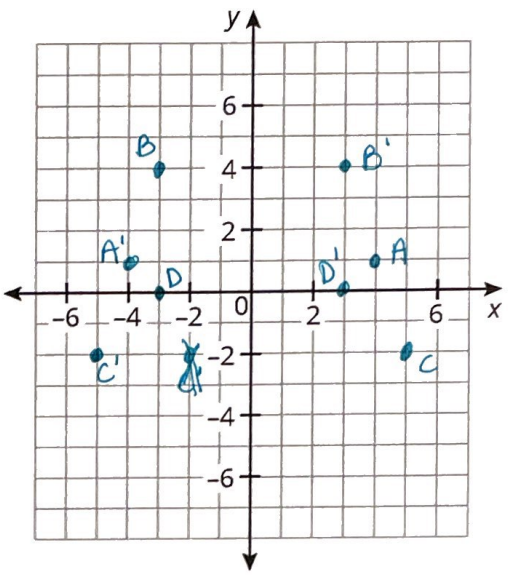
- Plot and label the point on patty paper.
- Fold the patty paper on the *y*-axis.
- Trace the point through the patty paper.
- Label the coordinates of the new point.

ⓐ $A\,(4, 1)$ A' (-4 , 1)

ⓑ $B\,(-3, 4)$ B' (3 , 4)

ⓒ $C\,(5, -2)$ C' (-5 , -2)

ⓓ $D\,(-3, 0)$ D' (3 , 0)



4 What did you notice about the coordinates of the original points and their reflections? **Write a generalization for the relationship between the coordinates of a point and its reflection across the *y*-axis.**

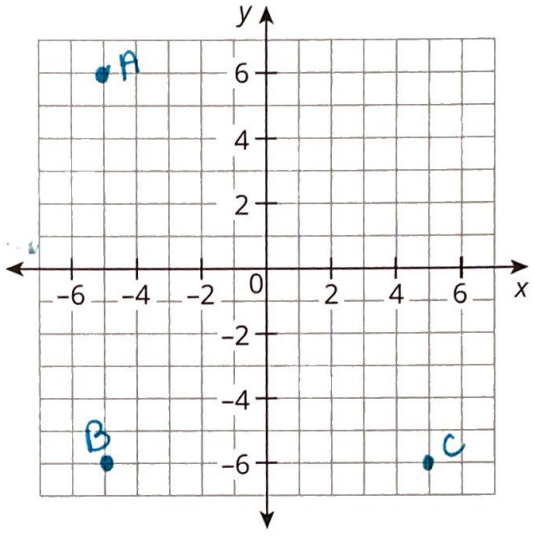
The y coordinate stays the same but the x coordinate is its opposite. in the reflected points

* you are moving side to side (x coordinate changes) not up or down

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

Your teacher is going to select students to plot ordered pairs that meet specific conditions. The students will select locations that satisfy those conditions.

5 Plot and label the point where each student is standing on the coordinate plane. Then record the coordinates of that point in the table.



Student	Condition	Location
A	Quadrant II	(-5, 6)
B	Reflection of *A* across the *x*-axis	(-5, -6)
C	Reflection of *B* across the *y*-axis	(5, -6)

6 Compare the ordered pairs for *A* and *C*. What do you notice about their coordinates? **Write a generalization for the relationship between the coordinates of a point and its reflection across both axes.**

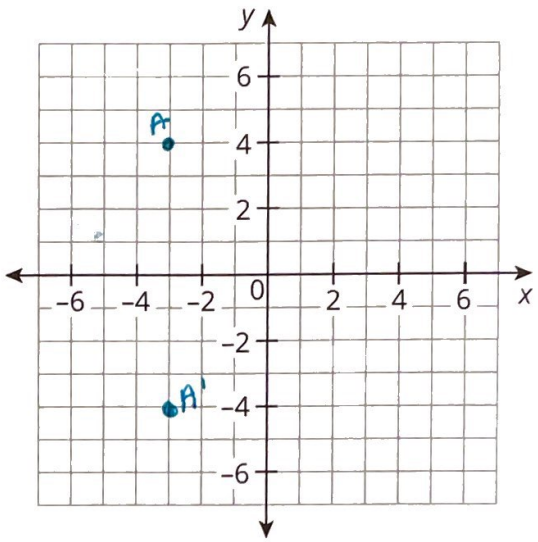
The x & y coordinates are both opposites

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

7 For each pair of conditions, plot and label two points. Record the coordinates of the points.

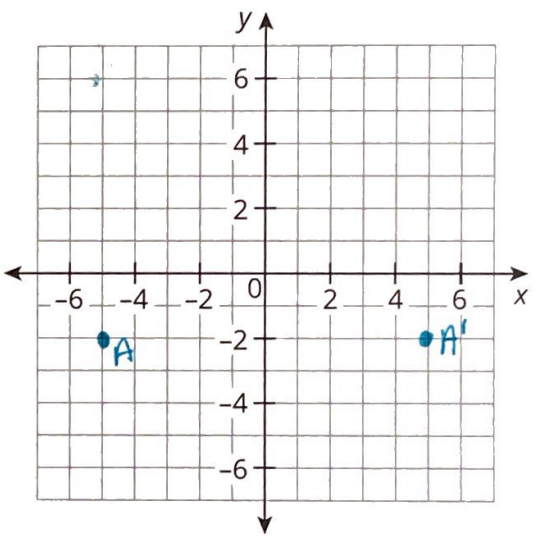
(a) One point is in Quadrant II.
The two points are reflections of each other across the *x*-axis.

A(-3, 4)
A'(-3, -4)



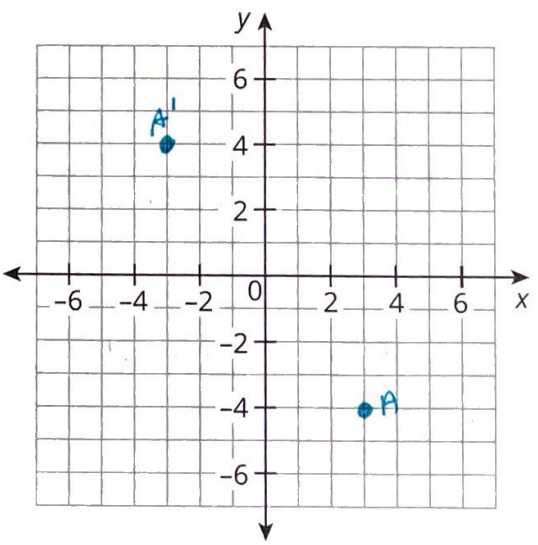
(b) One point is in Quadrant III.
The points are reflections of each other across the *y*-axis.

A(-5, -2)
A'(5, -2)



(c) One point is in Quadrant IV.
The points are reflections of each other across both axes.

A(3, -4)
A'(-3, 4)



8 In general, how are points that are reflections across one or both axes similar to and different from each other?

The contain the same numbers the signs are just different.