

Teacher Notes.

Lesson 16: Symmetry in the Coordinate Plane

Classwork

Opening Exercise

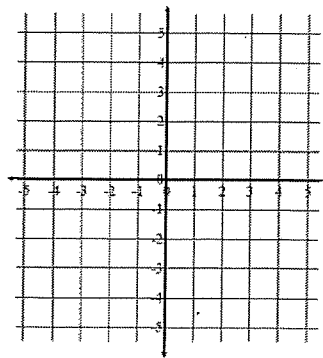
Give an example of two opposite numbers, and describe where the numbers lie on the number line. How are opposite numbers similar, and how are they different?

VARY. 2 and -2 are opposites because they are both two units away from zero on the numberline but in opposite directions. Opposites are similar because they have the same absolute value, but are different because opposites are on opposite sides of zero.

Example 1: Extending Opposite Numbers to the Coordinate Plane

Extending Opposite Numbers to the Coordinates of Points on the Coordinate Plane

Locate and label your points on the coordinate plane to the right. For each given pair of points in the table below, record your observations and conjectures in the appropriate cell. Pay attention to the absolute values of the coordinates and where the points lie in reference to each axis.



	$(3, 4)$ and $(-3, 4)$	$(3, 4)$ and $(3, -4)$	$(3, 4)$ and $(-3, -4)$
Similarities of Coordinates	Same y-coordinates The x-coordinates have the same absolute value.	Same x-coordinates. The y-coordinates have the same .	The x-coordinates have same . The y-coordinates have same .
Differences of Coordinates	The x-coordinates are opposite numbers.	The y-coordinates are opposite numbers.	Both x & y coordinates are opposite numbers.

Similarities in Location	Both points are 4 units above x axis & 3 units away from y-axis.	Both points are 3 units to the right of the y-axis & 4 units away from x-axis.	Both points are 3 units from y-axis & 4 units from x-axis.
Differences in Location	One point is 3 units to the right of y-axis; the other is 3 units to the left of y-axis.	One point is 4 units above the x-axis; the other is 4 units below.	One point is 3 units right of the y-axis; the other is 3 units left. One point is 4 units above the x-axis; the other is 4 units below.
Relationship Between Coordinates and Location on the Plane			

Exercises

In each column, write the coordinates of the points that are related to the given point by the criteria listed in the first column of the table. Point $S(5,3)$ has been reflected over the x - and y -axes for you as a guide, and its images are shown on the coordinate plane. Use the coordinate grid to help you locate each point and its corresponding coordinates.

Given Point:	$S(5,3)$	$(-2,4)$	$(3,-2)$	$(-1,-5)$	
The given point is reflected across the x -axis.	$M(5,3)$	$(-2,4)$	$(3,2)$	$(-1,5)$	
The given point is reflected across the y -axis.	$L(-5,3)$	$(2,4)$	$(-3,2)$	$(1,-5)$	
The given point is reflected first across the x -axis and then across the y -axis.	$A(-5,-3)$	$(2,-4)$	$(-3,2)$	$(1,5)$	
The given point is reflected first across the y -axis and then across the x -axis.	$A(-5,-3)$	$(2,-4)$	$(-3,2)$	$(1,5)$	

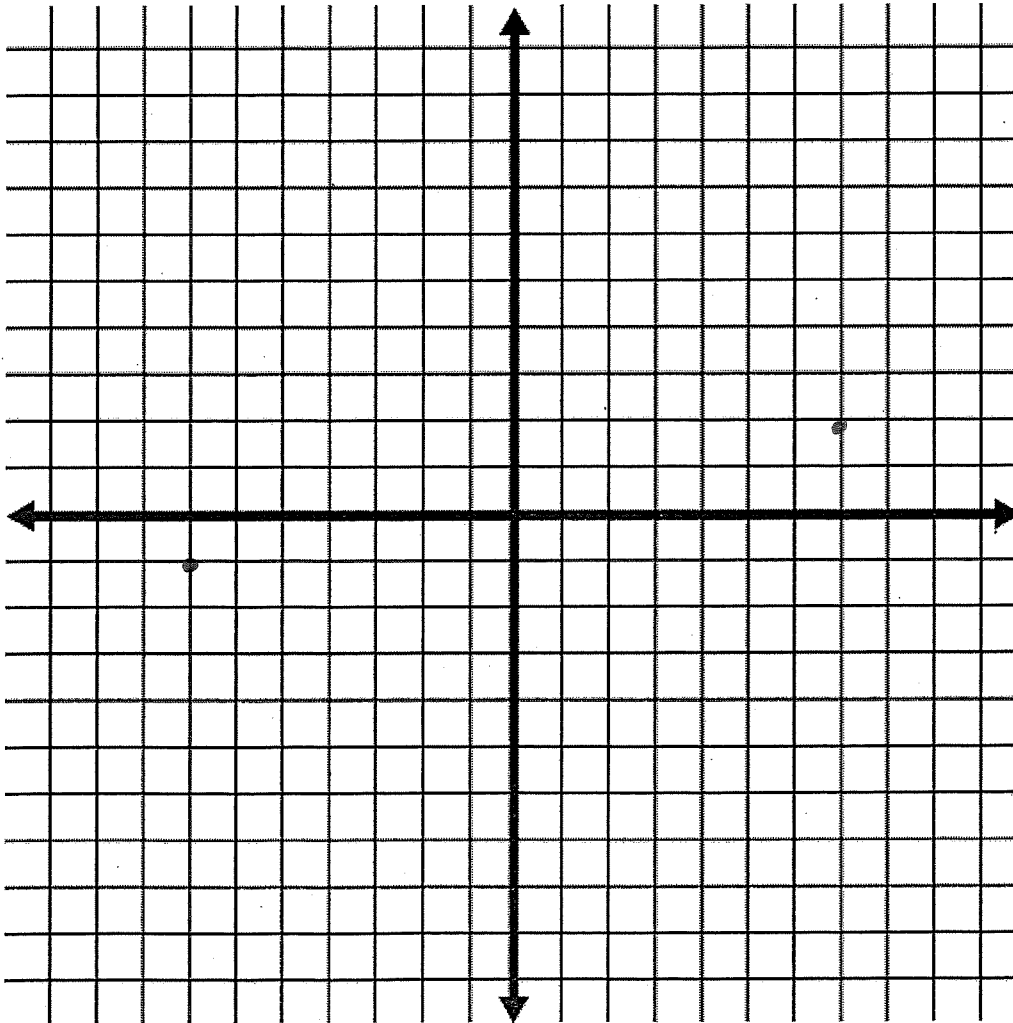
1. When the coordinates of two points are (x, y) and $(-x, y)$, what line of symmetry do the points share? Explain.

They share the y -axis because the y -coordinates are the same and the x -coordinates are opposites.

2. When the coordinates of two points are (x, y) and $(x, -y)$, what line of symmetry do the points share? Explain.

They share the x -axis because the x -coordinates are the same & the y -coordinates are opposites.

Examples 2–3: Navigating the Coordinate Plane



your
Numberline
This will
help...