

## Lesson 18: Distance on the Coordinate Plane

### Classwork

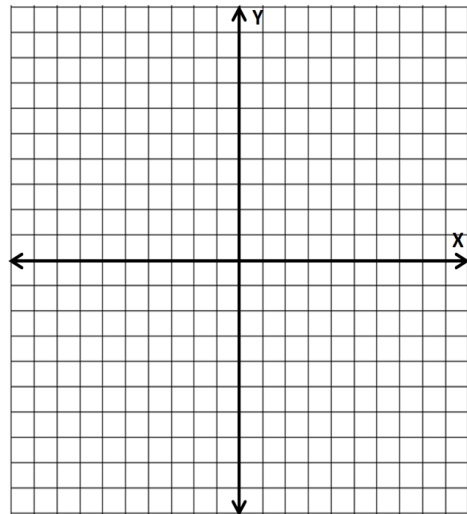
#### Exercise

Find the lengths of the line segments whose end points are given below. Explain how you determined that the line segments are horizontal or vertical.

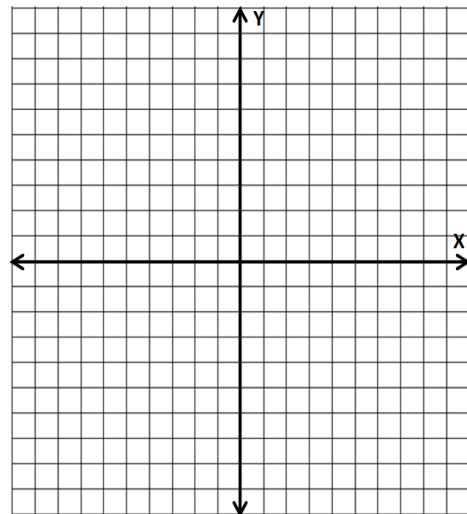
- $(-3, 4)$  and  $(-3, 9)$
- $(2, -2)$  and  $(-8, -2)$
- $(-6, -6)$  and  $(-6, 1)$
- $(-9, 4)$  and  $(-4, 4)$
- $(0, -11)$  and  $(0, 8)$

2. Construct a rectangle on the coordinate plane that satisfies each of the criteria listed below. Identify the coordinate of each of its vertices.
- Each of the vertices lies in a different quadrant.
  - Its sides are either vertical or horizontal.
  - The perimeter of the rectangle is 28 units.

Using absolute value, show how the lengths of the sides of your rectangle provide a perimeter of 28 units.



3. Locate and label  $(4, 5)$  and  $(4, -3)$ . Draw the line segment between the end points given on the coordinate plane. How long is the line segment that you drew? Explain.



4. Draw a horizontal line segment starting at  $(4, -3)$  that has a length of 9 units. What are the possible coordinates of the other end point of the line segment? (There is more than one answer.)

### Lesson Summary

To find the distance between points that lie on the same horizontal line or on the same vertical line, we can use the same strategy that we used to find the distance between points on the number line.

### Problem Set

1. Find the length of the line segment with end points  $(7, 2)$  and  $(-4, 2)$ , and explain how you arrived at your solution.
2. Sarah and Jamal were learning partners in math class and were working independently. They each started at the point  $(-2, 5)$  and moved 3 units vertically in the plane. Each student arrived at a different end point. How is this possible? Explain and list the two different end points.
3. The length of a line segment is 13 units. One end point of the line segment is  $(-3, 7)$ . Find four points that could be the other end points of the line segment.
4. One end point of a line segment is  $(-3, -6)$ . The length of the line segment is 7 units. Find four points that could serve as the other end point of the given line segment.