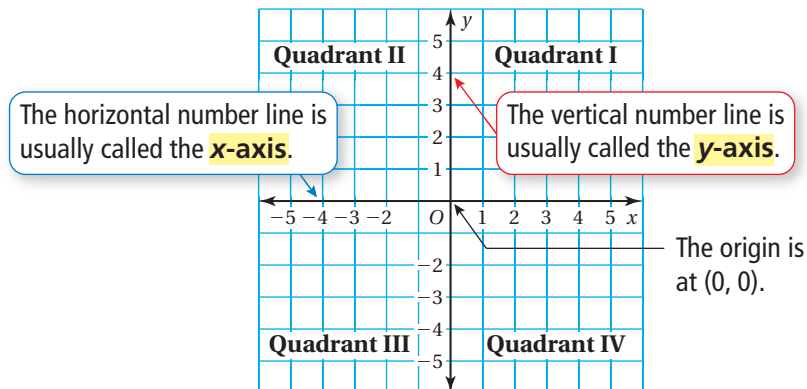


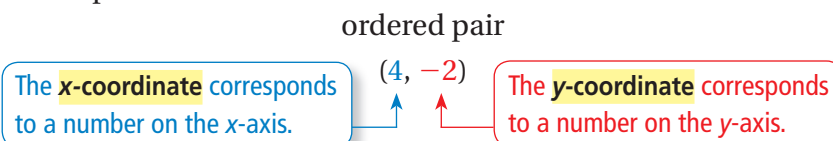
Key Idea

The Coordinate Plane

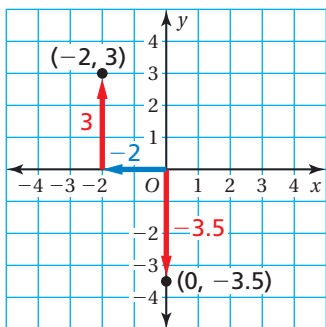
A **coordinate plane** is formed by the intersection of a horizontal number line and a vertical number line. The number lines intersect at the **origin** and separate the coordinate plane into four regions called **quadrants**.



An **ordered pair** is a pair of numbers that is used to locate a point in a coordinate plane.



EXAMPLE 1 Plotting Ordered Pairs



Plot (a) $(-2, 3)$ and (b) $(0, -3.5)$ in a coordinate plane. Describe the location of each point.

- Start at the origin. Move 2 units **left** and 3 units **up**. Then plot the point.
 - The point is in Quadrant II.
- Start at the origin. Move 3.5 units **down**. Then plot the point.
 - The point is on the y-axis.

Practice

Plot the ordered pair in a coordinate plane. Describe the location of the point.

- $J(3, -1)$
- $K(-5, 0)$
- $L(-2.5, -1)$
- $M\left(-1\frac{1}{2}, \frac{1}{2}\right)$
- REASONING** Both coordinates of a point are negative. In which quadrant is the point located? Describe the signs of the coordinates in each of the other three quadrants.

EXAMPLE 2 Real-Life Application

Reading

An **archaeologist** studies ancient ruins and objects to learn about people and cultures.

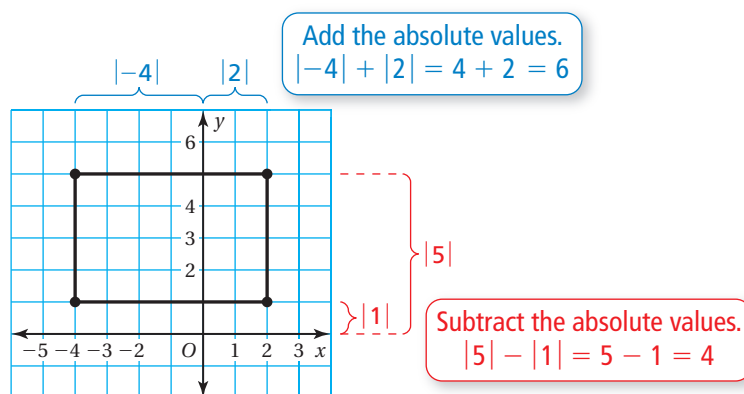
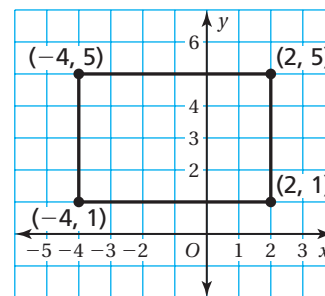


An *archaeologist* divides an area using a coordinate plane in which each unit represents 1 meter. The corners of a secret chamber are found at $(-4, 5)$, $(2, 5)$, $(2, 1)$, and $(-4, 1)$. What are the dimensions of the secret chamber?

Draw the secret chamber in a coordinate plane.

The length of the chamber is the distance between $(-4, 5)$ and $(2, 5)$. The width of the chamber is the distance between $(2, 5)$ and $(2, 1)$.

Use absolute values to find the distances between the points.



••• The secret chamber is 6 meters long and 4 meters wide.

Practice

The points represent vertices of a polygon. Graph the polygon in a coordinate plane.

6. $J(3, 4)$, $K(3, -2)$, $L(-1, -2)$

7. $P(-5, 3)$, $Q(-1, 3)$, $R(-1, -4)$, $S(-5, -4)$

8. **GEOMETRY** Find the area of the figure in Exercise 6.

9. **GEOMETRY** Find the perimeter of the figure in Exercise 7.

10. **ARCHAEOLOGY** In Example 2, a gold coin is found at $(-1, 4)$, a silver coin is found at $(-4, 2)$, and pottery is found at $(-4, 4)$. How much closer is the pottery to the silver coin than to the gold coin?

11. **REASONING** Point A is a reflection of point B in the y -axis. Point C is a reflection of point B in the x -axis.

- What do you notice about the signs of the coordinates of the reflection in the y -axis? x -axis?
- Describe reflections that relate point A and point C . What do you notice about the signs of the coordinates?

