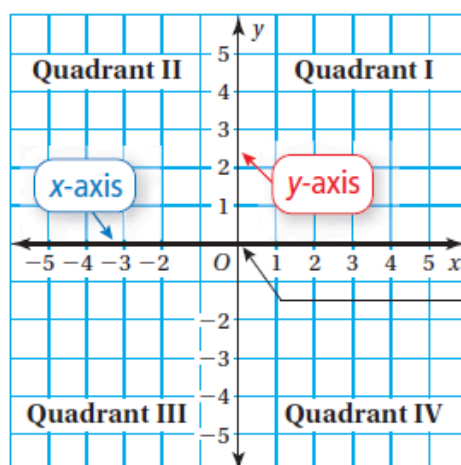


Previously, you plotted points with positive coordinates. Now, you will plot points with positive and negative coordinates.

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**.



The origin is at $(0, 0)$.

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

ordered pair: $(4, -2)$

x-coordinate \rightarrow **y-coordinate**

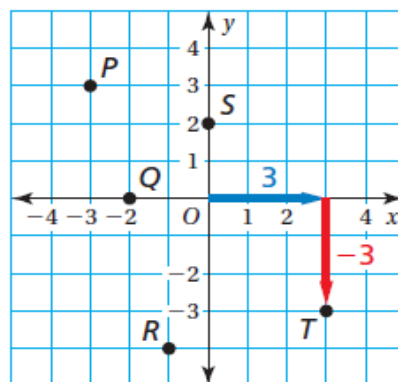
Identifying an Ordered Pair

Which ordered pair corresponds to Point T ?

- A. $(-3, -3)$ B. $(-3, 3)$
C. $(3, -3)$ D. $(3, 3)$

Point T is 3 units to the **right** of the origin and 3 units **down**. So, the x -coordinate is 3 and the y -coordinate is -3 .

► The ordered pair $(3, -3)$ corresponds to Point T . The correct answer is C.



Try It Use the graph in Example 1 to write an ordered pair corresponding to the point.

1. Point P 2. Point Q 3. Point R 4. Point S

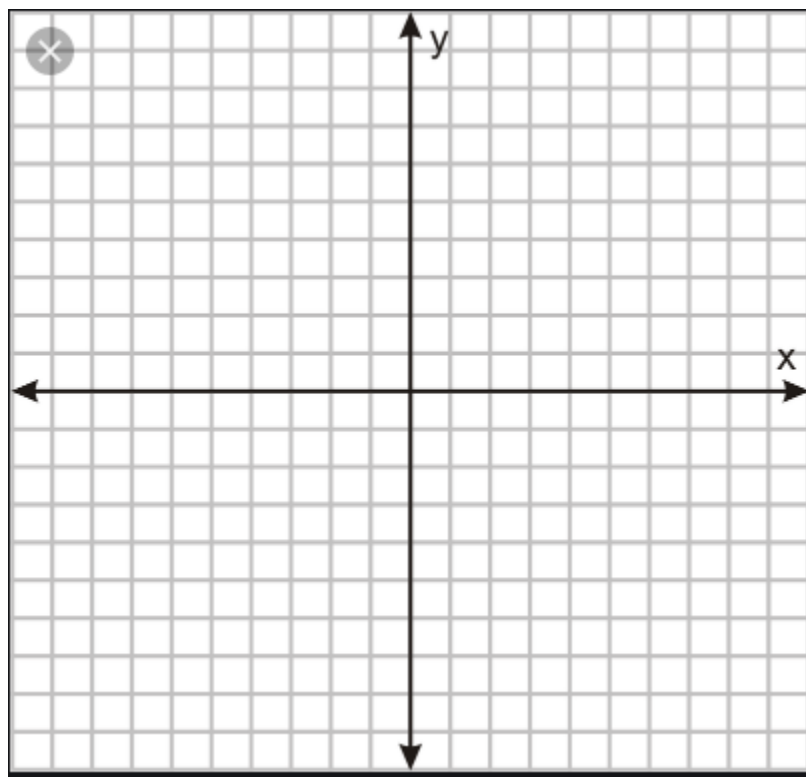
Try It Plot the ordered pair in a coordinate plane. Describe the location of the point.

5. $(3, -1)$

6. $(-5, 0)$

7. $(-2.5, -1)$

8. $\left(-1\frac{1}{2}, \frac{1}{2}\right)$



Key Idea

Reflecting a Point in the Coordinate Plane

- To reflect a point in the x -axis, use the same x -coordinate and take the opposite of the y -coordinate.
- To reflect a point in the y -axis, use the same y -coordinate and take the opposite of the x -coordinate.

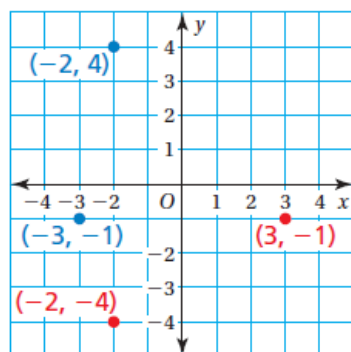
EXAMPLE 3**Reflecting Points in One Axis**

- a. Reflect $(-2, 4)$ in the x -axis.

Plot $(-2, 4)$.

To reflect $(-2, 4)$ in the x -axis, use the same x -coordinate, -2 , and take the opposite of the y -coordinate. The opposite of 4 is -4 .

► So, the reflection of $(-2, 4)$ in the x -axis is $(-2, -4)$.



- b. Reflect $(-3, -1)$ in the y -axis.

Plot $(-3, -1)$.

To reflect $(-3, -1)$ in the y -axis, use the same y -coordinate, -1 , and take the opposite of the x -coordinate. The opposite of -3 is 3 .

► So, the reflection of $(-3, -1)$ in the y -axis is $(3, -1)$.

Reflecting a Point in Both Axes

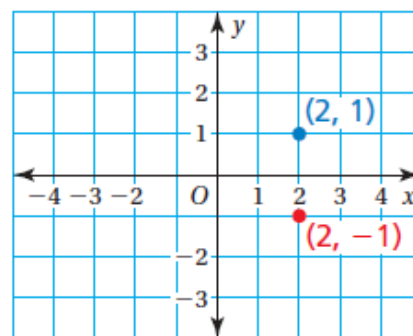
Reflect $(2, 1)$ in the x -axis followed by the y -axis.

Step 1: Plot $(2, 1)$.

Step 2: Reflect $(2, 1)$ in the x -axis.

Use the same x -coordinate, 2 , and take the opposite of the y -coordinate. The opposite of 1 is -1 .

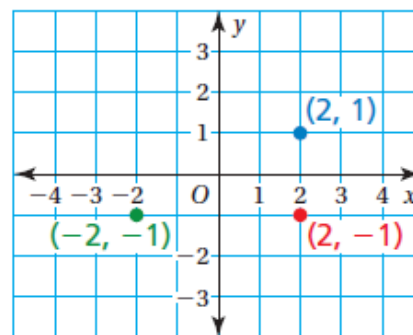
The reflection of $(2, 1)$ in the x -axis is $(2, -1)$.



Step 3: Reflect $(2, -1)$ in the y -axis.

Use the same y -coordinate, -1 , and take the opposite of the x -coordinate. The opposite of 2 is -2 .

The reflection of $(2, -1)$ in the y -axis is $(-2, -1)$.



► So, the reflection of $(2, 1)$ in the x -axis followed by the y -axis is $(-2, -1)$.