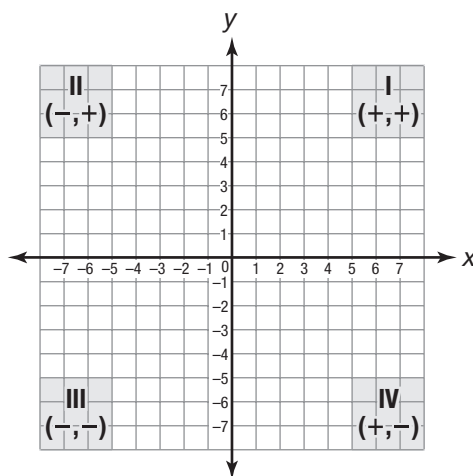


# The Coordinate Plane



## Getting the Idea

You can use a **coordinate plane** to locate points. A coordinate plane is formed by a horizontal number line, called the **x-axis**, and a vertical number line, called the **y-axis**. Each axis includes both positive and negative numbers. The coordinate plane is divided into four sections called **quadrants**. They are numbered with Roman numerals in a counterclockwise direction, as shown below.



An **ordered pair** of numbers in the form  $(x, y)$  names a point on a coordinate plane. The first number of the ordered pair is the **x-coordinate**. It tells how many units to move to the left or the right of the **origin**, point  $(0, 0)$ . The second number is the **y-coordinate**. It tells how many units to move up or down from the origin.

By looking at whether the  $x$ - and  $y$ -coordinates are positive or negative, you can tell which quadrant contains a given point without seeing it graphed on a coordinate plane. Use the table below to help you.

Quadrant	x-coordinate	y-coordinate
I	+	+
II	-	+
III	-	-
IV	+	-

Points on the  $x$ -axis or the  $y$ -axis are not in any quadrant.

**Example 1**

Plot  $(-4, 6)$  on the coordinate plane. Label the point  $A$ .

**Strategy** Use ordered pairs to plot a point.

**Step 1**

Use the signs of the coordinates to find the quadrant for point  $A$ .

The coordinates for point  $A$  are (negative, positive), or  $(-, +)$ .  
Point  $A$  will be in quadrant II.

**Step 2**

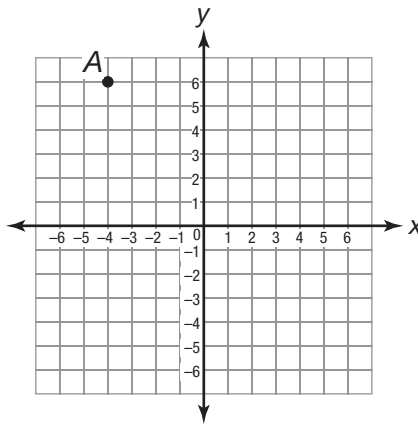
Start at the origin. Find the  $x$ -coordinate for point  $A$ .

The  $x$ -coordinate is  $-4$ .  
Move 4 units to the left.

**Step 3**

From  $-4$  on the  $x$ -axis, find the  $y$ -coordinate for point  $A$ .

The  $y$ -coordinate is 6.  
Move up 6 units and label point  $A$ .



**Solution** Point  $A$  is shown on the coordinate plane above.

## Example 2

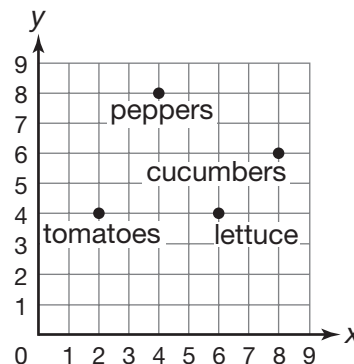
Jody used a coordinate grid to map where she planted each type of vegetable. What ordered pair tells where Jody planted lettuce?

**Strategy**     **Locate the point on the plane. Find the coordinates.**

Lettuce lines up with 6 on the  $x$ -axis and 4 on the  $y$ -axis.

Its coordinates are  $(6, 4)$ .

**Solution**     **Jody planted lettuce at  $(6, 4)$ .**



## Example 3

Plot  $(5.5, -3.5)$  on a coordinate plane. Label the point  $M$ .

**Strategy**     **Use ordered pairs to plot a point.**

**Step 1**

Use the signs of the coordinates to find the quadrant for point  $M$ .

The coordinates for point  $M$  are (positive, negative), or  $(+, -)$ .

Point  $M$  will be in quadrant IV.

**Step 2**

Start at the origin. Find the  $x$ -coordinate for point  $M$ .

The  $x$ -coordinate is 5.5.

The point will be halfway between 5 and 6 on the  $x$ -axis.

**Step 3**

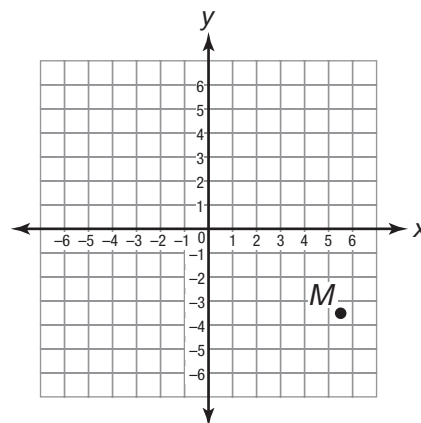
From 5.5 on the  $x$ -axis, find the  $y$ -coordinate for point  $M$ .

The  $y$ -coordinate is  $-3.5$ .

The point will be halfway between  $-3$  and  $-4$  on the  $y$ -axis.

Notice that point  $M$  is **not** on any of the grid lines of the coordinate plane.

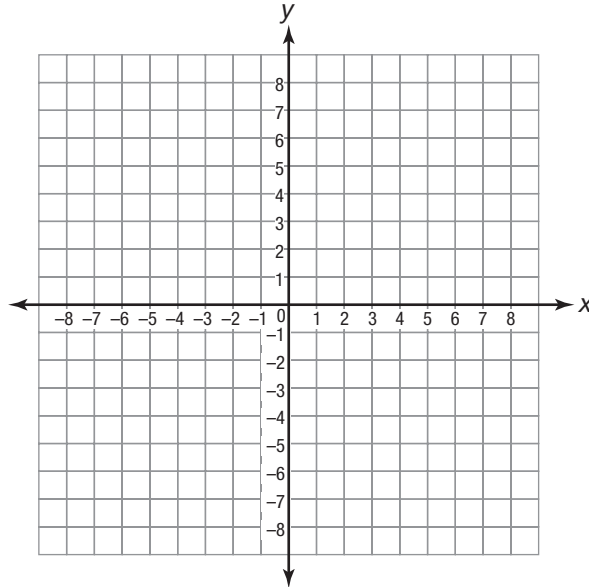
**Solution**     **Point  $M$  is shown on the coordinate plane above.**





## Coached Example

The coordinate plane below represents the streets in Brad and Cara's town.



**Brad's house is at  $(-6, 6\frac{1}{2})$  and Cara's house is at  $(4\frac{1}{2}, -5)$ . Plot and label the points for both houses.**

Start with Brad's house.

The \_\_\_\_-coordinate is negative and the \_\_\_\_-coordinate is positive.

The point for Brad's house will be in quadrant \_\_\_\_\_.

Start at the origin, which is the point (\_\_\_\_, \_\_\_\_).

Move 6 units to the \_\_\_\_\_ of the origin.

From \_\_\_\_ on the  $x$ -axis, move \_\_\_\_\_  $6\frac{1}{2}$  units.

**Plot the point and label it "B" for Brad.**

Now locate Cara's house.

The \_\_\_\_-coordinate is positive and the \_\_\_\_-coordinate is negative.

The point for Cara's house will be in quadrant \_\_\_\_\_.

Start at the origin and move  $4\frac{1}{2}$  units to the \_\_\_\_\_.

From \_\_\_\_ on the  $x$ -axis, move \_\_\_\_\_ 5 units.

**Plot the point and label it "C" for Cara.**