

Negative Numbers and Coordinate Graphing

In the real world, often times there is a need to represent numbers below zero which we call negative numbers. We will look at the meaning of negative numbers.

Graphing in the coordinate plane has lots of practical uses. We use a coordinate graphing system to map points on a map. We'll look at an all positive coordinate system, and then we will extend our knowledge of coordinate graphing to include the negative numbers.

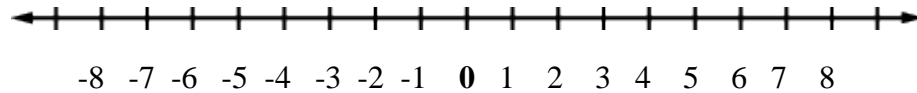
Exploring Negative Numbers

Graphing in Quadrant I of the Coordinate Plane

Graphing in Quadrants II, III, and IV of the Coordinate Plane

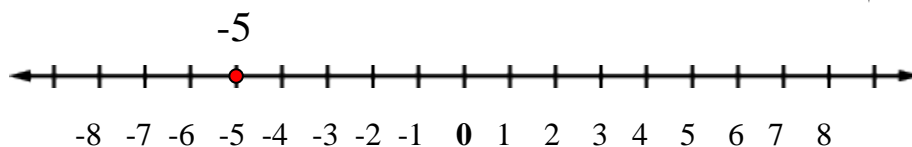
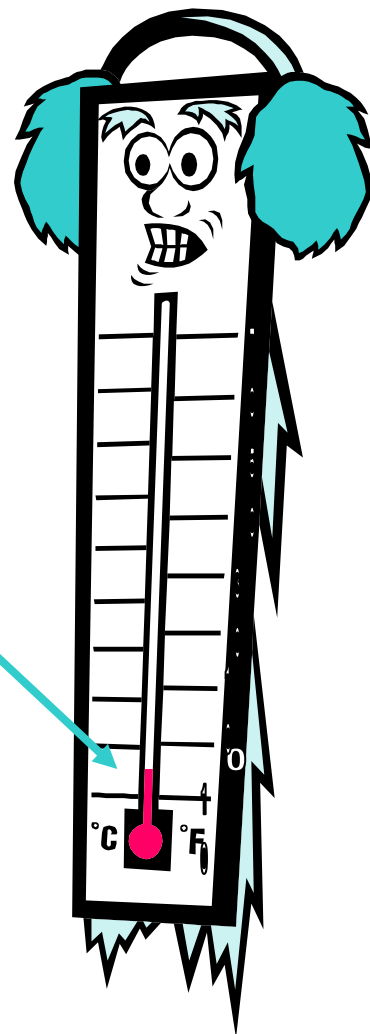
Exploring Negative Numbers

In the real world often times there is a need to represent numbers below zero which we call negative numbers. A number line that includes negative numbers would look like this.



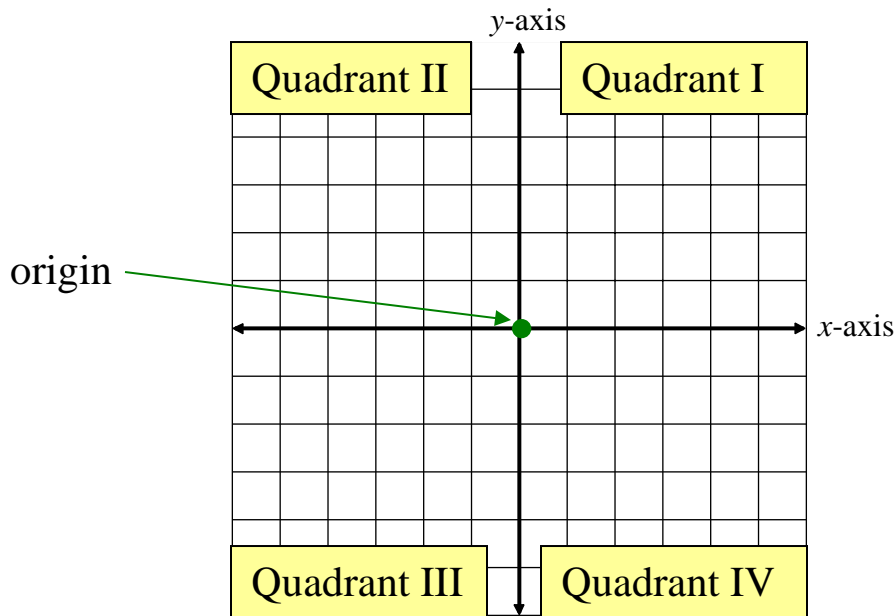
Here is an example of the use of negative numbers.

The temperature on this thermometer is **below 0** somewhere around 5 degrees below zero. This can be written as **-5 degrees**.



Graphing in Quadrant I of the Coordinate Plane

In a **coordinate plane**, points may be located by **plotting** them. The coordinate plane is divided into **four quadrants** by the **x -axis** and the **y -axis**. The starting point, the **origin**, is the center, or point where the x and y axis intersect (cross).



A point is designated by both an **x -coordinate** and a **y -coordinate**. The origin's coordinates would be $(0, 0)$. The x -coordinate is the first number and the y -coordinate is the second number.

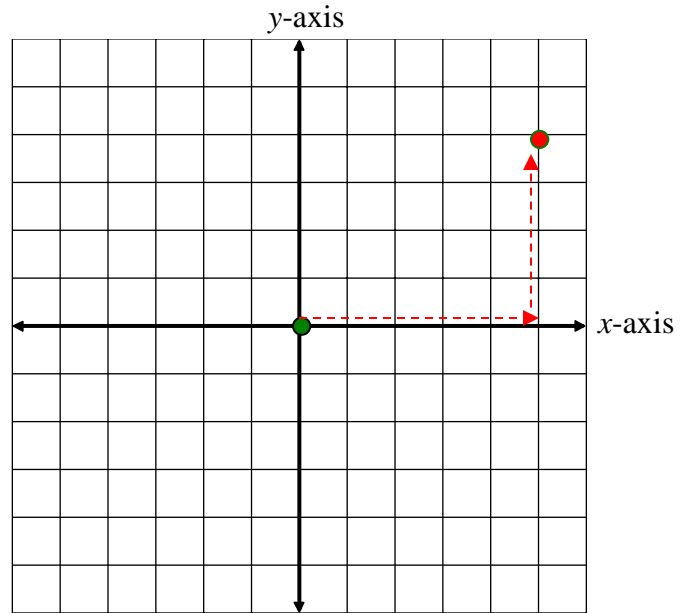
The **x -coordinate** is how far you count **right or left** of the origin. The **y -coordinate** is how far you then count **up or down**. A point's location is written as an **ordered pair** (x, y) .

Plot (5, 4)

When plotting points, start at the origin. Count right if the x -coordinate is positive; count left if it is negative.

Then count up if the y -coordinate is positive; count down if it is negative.

Starting at the origin, count 5 units to the right, and then count 4 units up.



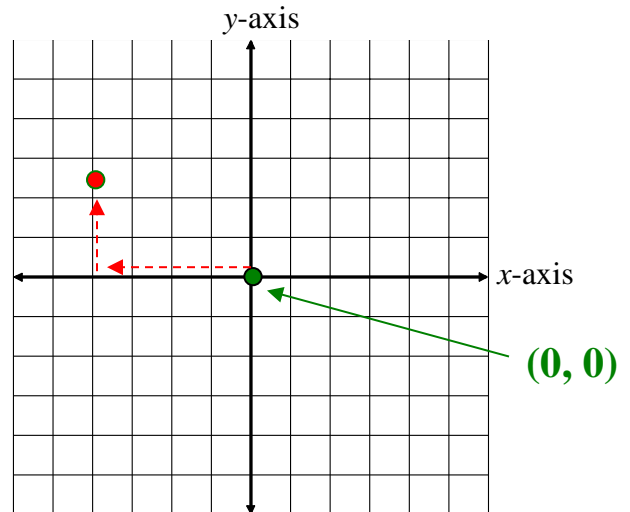
Graphing in Quadrants II, III, and IV

In these graphs, each space represents one unit. The starting point is the origin whose coordinates are $(0, 0)$.

Plot $(-4, 2)$

When plotting points, start at the origin. Count right if the x -coordinate is positive; count left if it is negative. Then count up if the y -coordinate is positive; count down if it is negative.

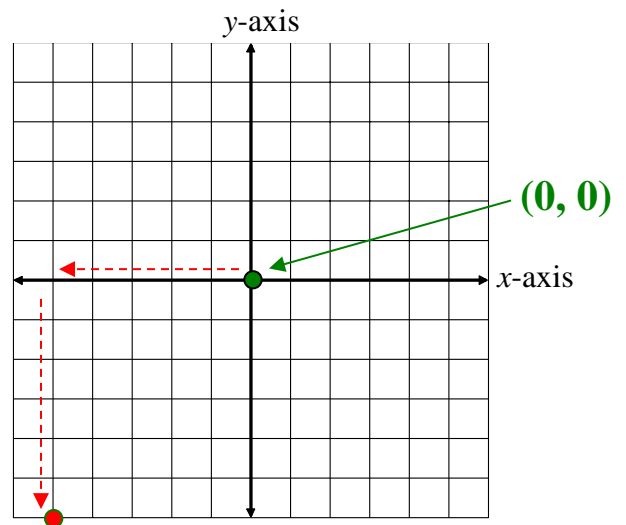
Starting at the origin, count 4 units to the left, and then count 2 units up.



Plot $(-5, -6)$

When plotting points, start at the origin. Count right if the x -coordinate is positive; count left if it is negative. Then count up if the y -coordinate is positive; count down if it is negative.

Starting at the origin, count 5 units to the left, and then count 6 units down.



Plot $(1, -3)$

When plotting points, start at the origin. Count right if the x -coordinate is positive; count left if it is negative. Then count up if the y -coordinate is positive; count down if it is negative.

Starting at the origin, count 1 unit to the right, and then count 3 units down.

