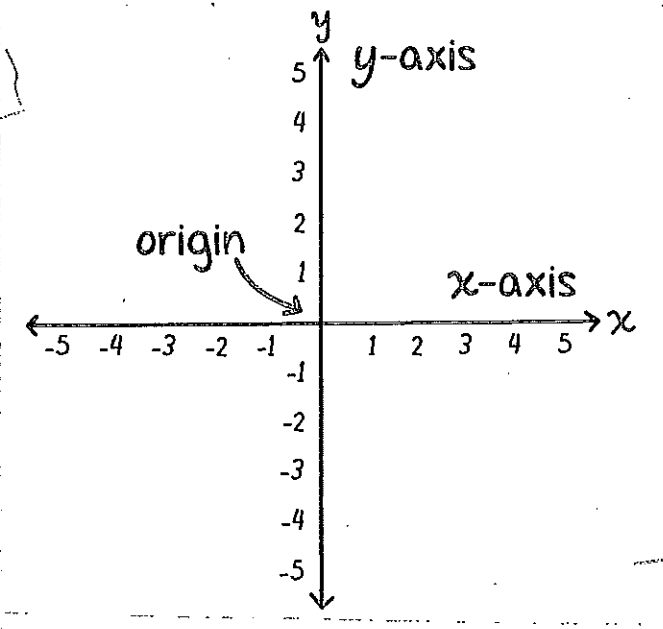
Chapter 55

The COORDINATE PLANE

A **COORDINATE PLANE** is a flat surface formed by the intersection of two lines or **AXES**: the horizontal line, known as the **X-AXIS**, and the vertical line, known as the **Y-AXIS**. The x- and y-axes intersect (cross) at the **ORIGIN**.



An ordered pair gives the coordinates (exact location) of a POINT. They are called an "ordered pair" because the order matters. The x-coordinate always comes first, then the y-coordinate, like so: (x,y). The x- and y-coordinates are separated by a comma and surrounded by parentheses.

EXAMPLE: The x-coordinate of the origin is 0, and the y-coordinate of the origin is also 0. So, the ordered pair of the origin is (0, 0).

X

If the x-coordinate is **POSITIVE**, move **RIGHT** from the origin.
If the x-coordinate is **NEGATIVE**, move **LEFT** from the origin.
If the x-coordinate is **ZERO**, you **STAY** at the origin.

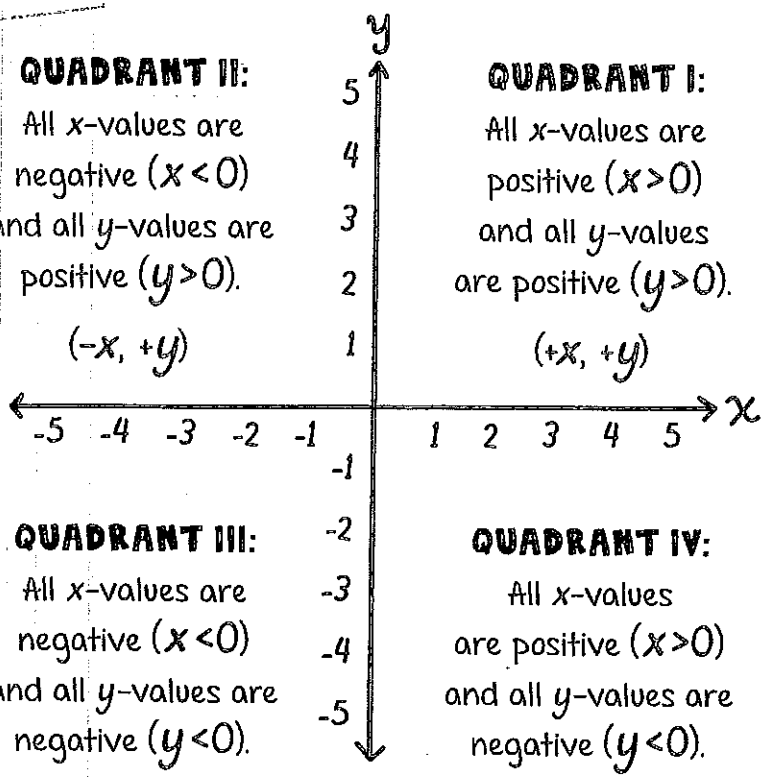
Y

If the y-coordinate is **POSITIVE**, move **UP** from the origin.
If the y-coordinate is **NEGATIVE**, move **DOWN** from the origin.
If the y-coordinate is **ZERO**, you **STAY** at the origin.

The coordinate plane is divided into four **QUADRANTS**.

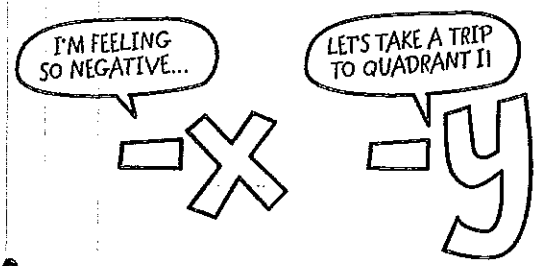
QUADRANT II:
All x-values are negative ($x<0$) and all y-values are positive ($y>0$).
$(-x, +y)$

QUADRANT I:
All x-values are positive ($x>0$) and all y-values are positive ($y>0$).
$(+x, +y)$



QUADRANT III:
All x-values are negative ($x<0$) and all y-values are negative ($y<0$).
$(-x, -y)$

QUADRANT IV:
All x-values are positive ($x>0$) and all y-values are negative ($y<0$).
$(+x, -y)$



DISTANCE

If two points have the same x-coordinate or the same y-coordinate, we can find the distance between the points. First, find the difference of the two different coordinates by using subtraction. Next, calculate the absolute value of that number.

EXAMPLE: Point A is located at $(2, 9)$. Point B is located at $(5, 9)$. What is the distance between Points A and B?

Point A and Point B share the same y-coordinate (which is 9), so we simply find the difference of the x-coordinates, which is

$5 - 2 = 3$ (or $2 - 5 = -3$).

Next, we calculate the absolute value of that number ($|3|$ or $|-3|$), which is 3.

Therefore, Point A and Point B are 3 units apart.

If you plot Points A and B, then draw a line to connect them, you will get a horizontal line because the y-coordinates are the same. The same method works if the x-coordinates are the same.