

Graphing

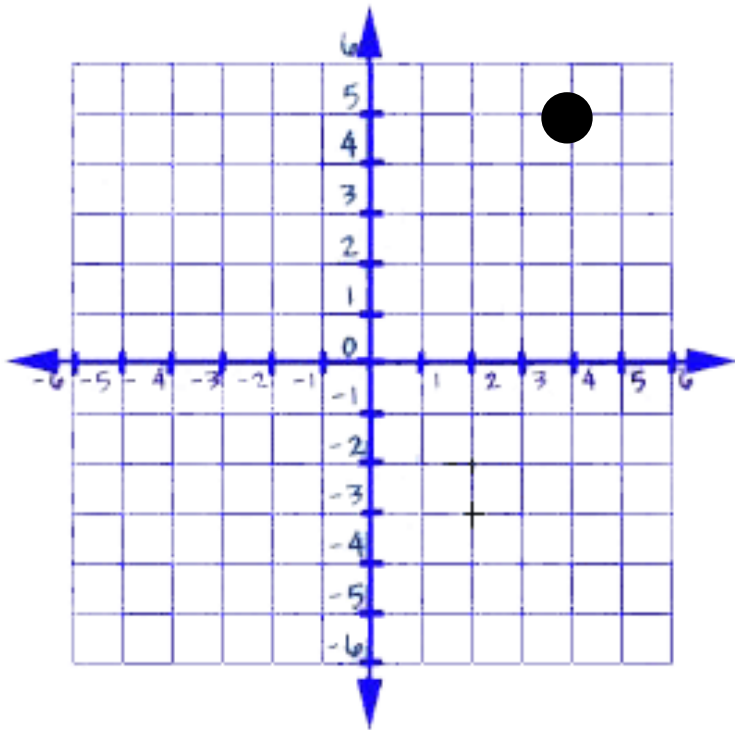
- The graph paper we traditionally use to graph is officially called Cartesian coordinates (named after French mathematician Rene Descartes).
- In Cartesian coordinates, two lines divide an area into four separate regions.
 - The lines are called the x-axis and the y-axis
 - The regions are called quadrants (I, II, III, and IV)
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We write points as two numbers in parentheses: e.g.: $(5,3)$, $(2,-4)$, or $(-7,0)$

- The first number is called the **x-coordinate** and tells how far to go **across** from the origin to find the point.
- The second number is called the **y-coordinate** and tells how far to go **up or down** from the origin to find the point.

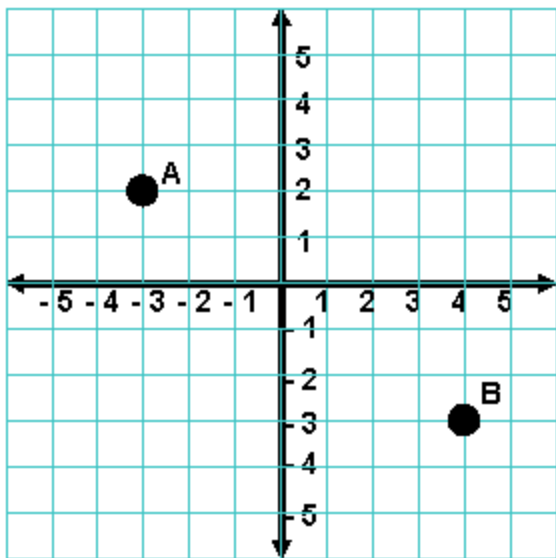
For instance ...

To graph $(4, 5)$ go across (to the right) 4 and up 5.

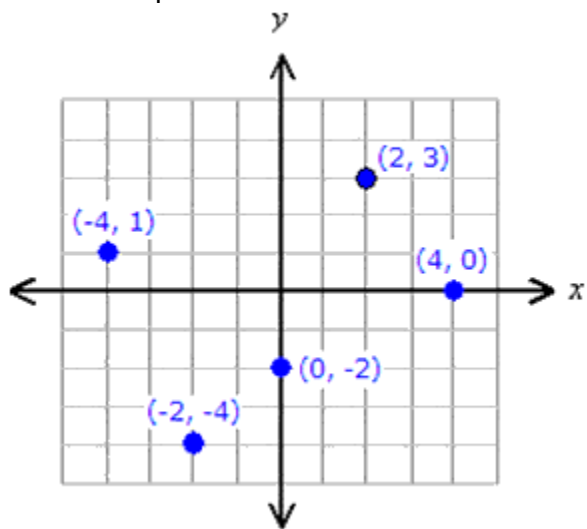


To graph $(-3,2)$ go left 3 and up 2

To graph $(4,-3)$ go right 4 and down 3.

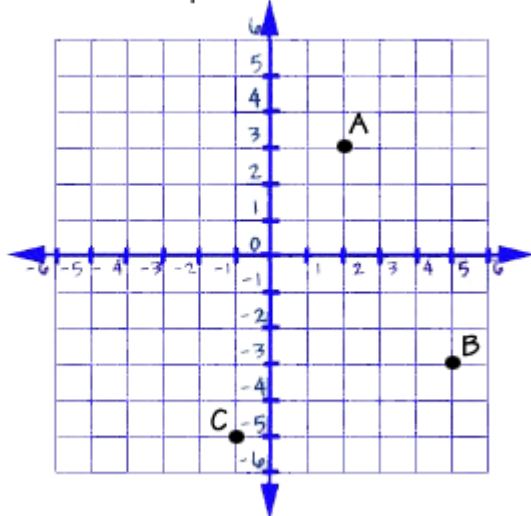


Other examples:



Write the *coordinates* of each point:

- A: (2, 3)
- B: (5, -3)
- C: (-1, -5)



You can graph equations by putting in values for x and plotting the corresponding y values.

You can then connect the points to see the complete graph.

Example: Graph $y = x^2$

x	$y = x^2$	(x,y)
0	$0^2 = 0$	(0,0)
1	$1^2 = 1$	(1,1)
2	$2^2 = 4$	(2,4)
3	$3^2 = 9$	(3,9)
-1	$(-1)^2 = 1$	(-1,1)
-2	$(-2)^2 = 4$	(-2,4)
-3	$(-3)^2 = 9$	(-3,9)

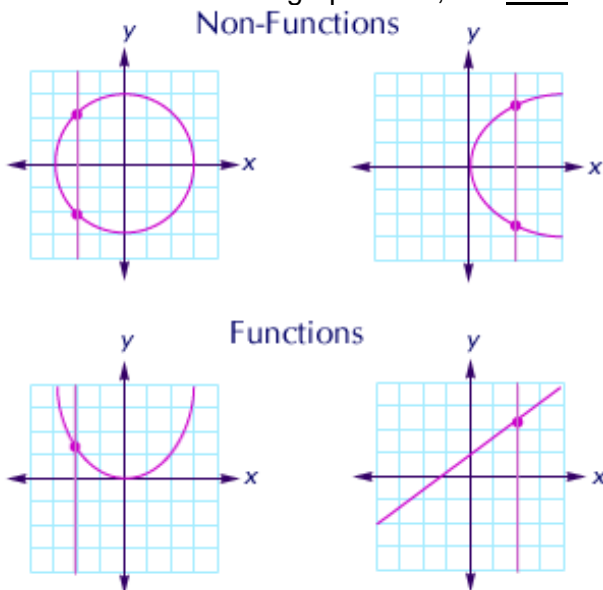
Function

- a set of points where each “ x ” is paired with only one “ y ”.
- a rule that assigns a unique output to each input
- a formula that can only give one answer for each number you plug in

One kind of question is whether or not a graph is a function

Vertical line test

If a vertical line ever intersects a graph twice, it is **NOT** a function.



Function Notation

We normally use parentheses ... like $f(x)$ or $g(x)$... to name functions.

The notation $f(x)$ is read “ f or x ”.

Essentially $f(x)$ is just a fancy way of saying “ y ”.

Examples of functions:

$$f(x) = 2x + 5$$

$$g(x) = 5x - 7$$

$$h(x) = x^2$$

A typical problem asks you to find a specific value for some function.

For instance “Find $f(4)$ ” means find the y -value when $x = 4$.

- In this example, $f(4) = 2 \cdot 4 + 5$, so $f(4) = 13$.