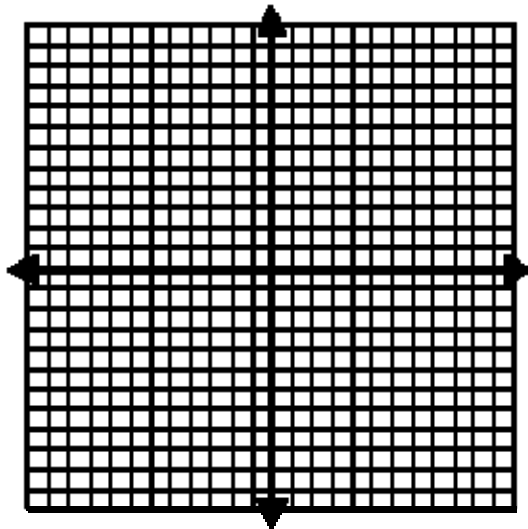


## GRAPHING

We normally plot points in what are called rectangular or Cartesian coordinates.

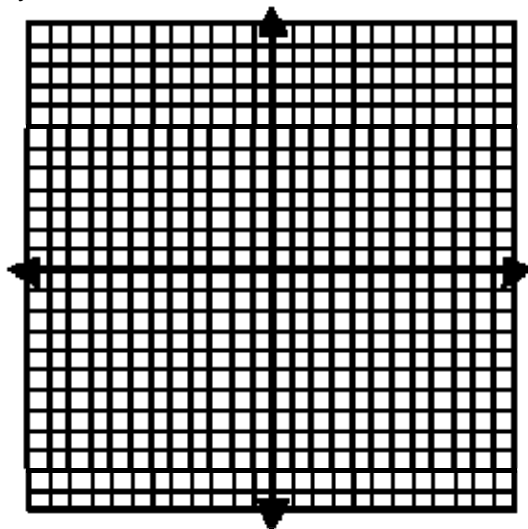


Graphing terms:

- x-axis
- y-axis
- origin
- Quadrants I, II, III, IV

Graphing a point

- Points are normally written in the form  $(x,y)$ .
- Start at the origin.
- Count across to the “x” number.
- From there, count up to the “y” number.

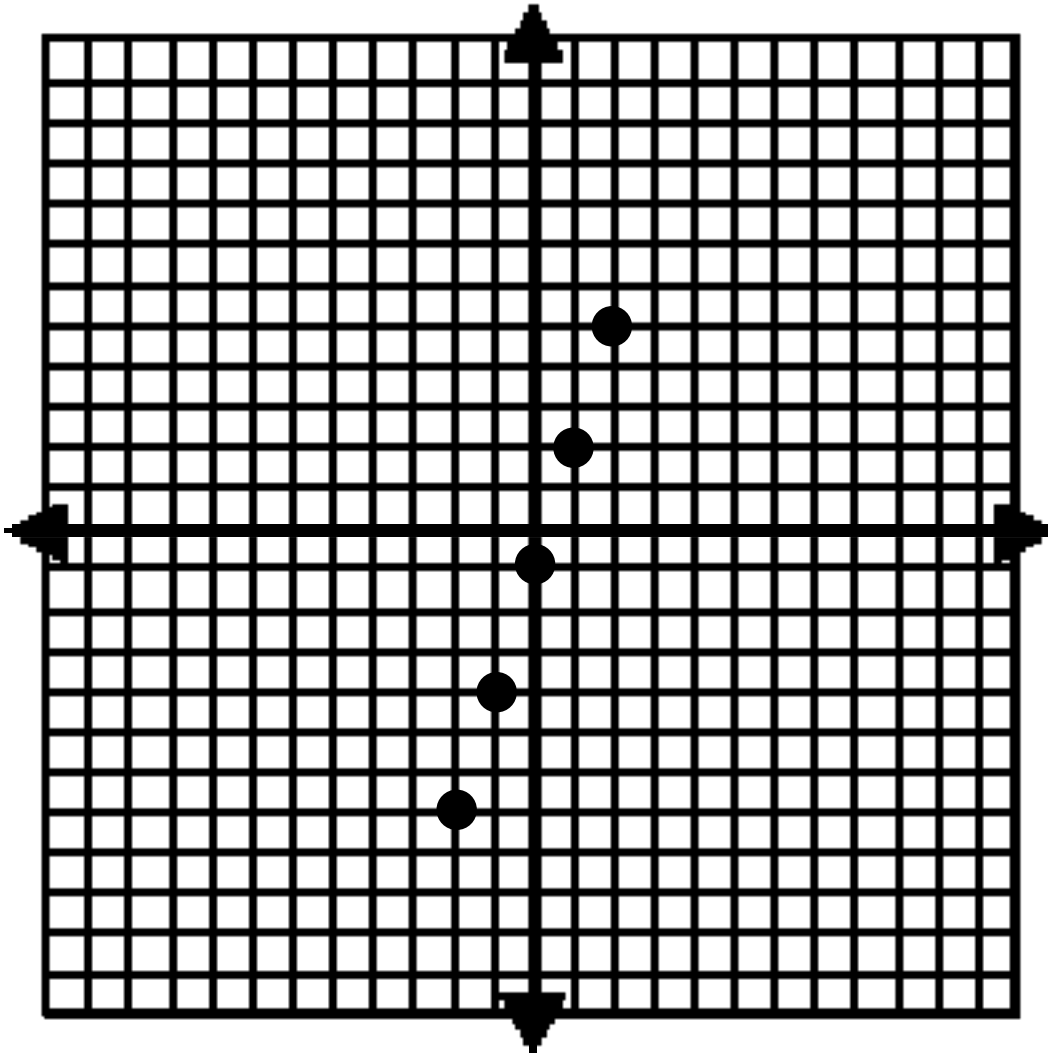


Graphing equations.

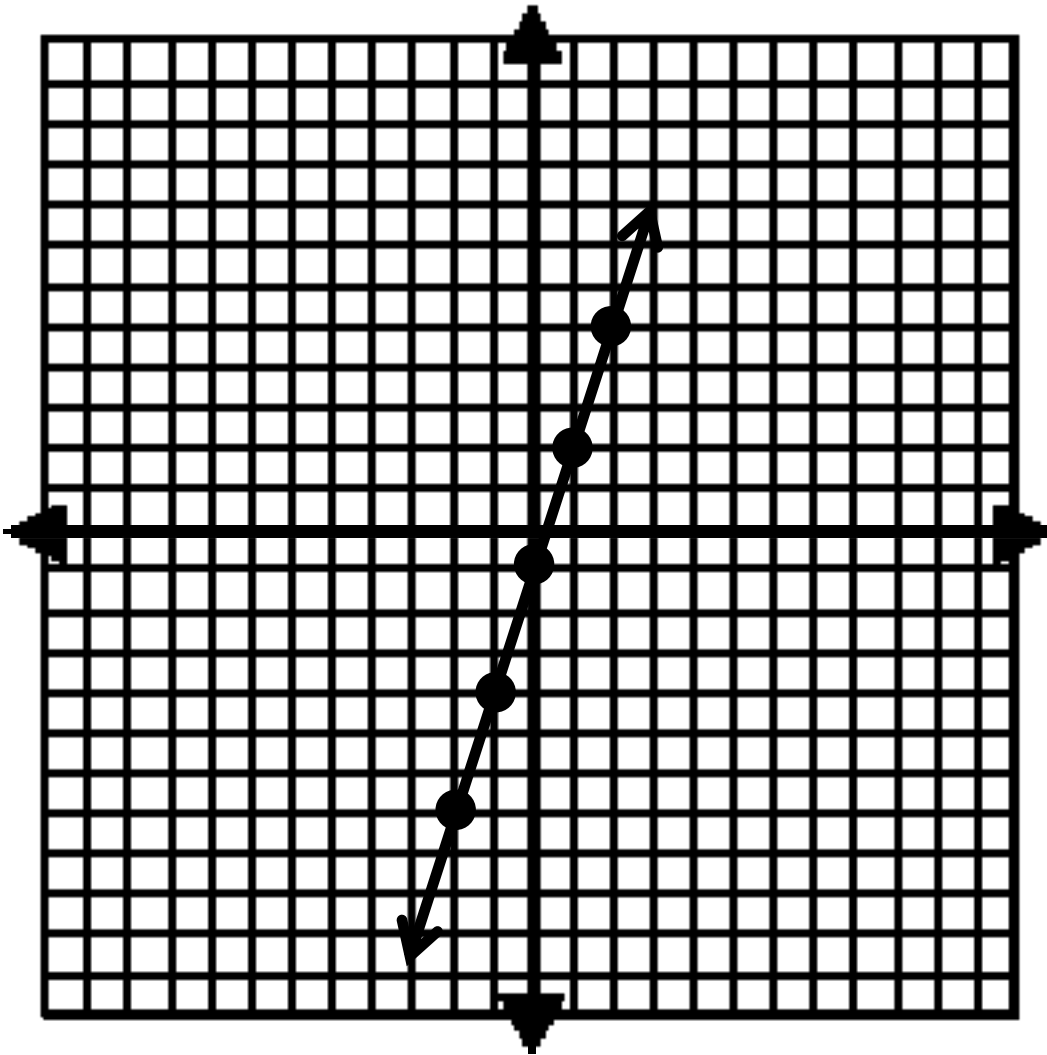
You can graph an equation by making a list of "x" values and finding the corresponding values of "y"

Example: Graph  $y = 3x - 1$

X	$y = 3x - 1$
0	-1
1	2
2	5
-1	-4
-2	-7

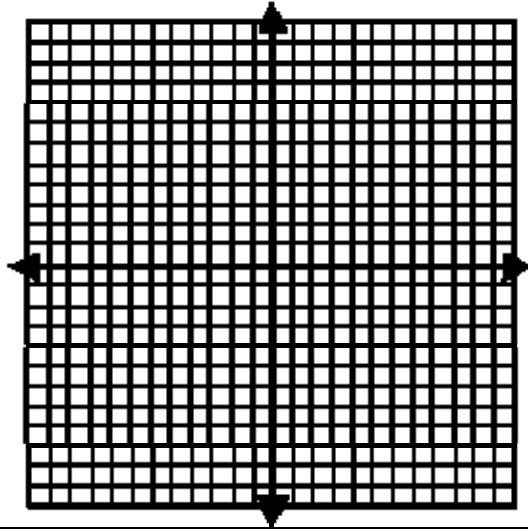


Connect the dots:

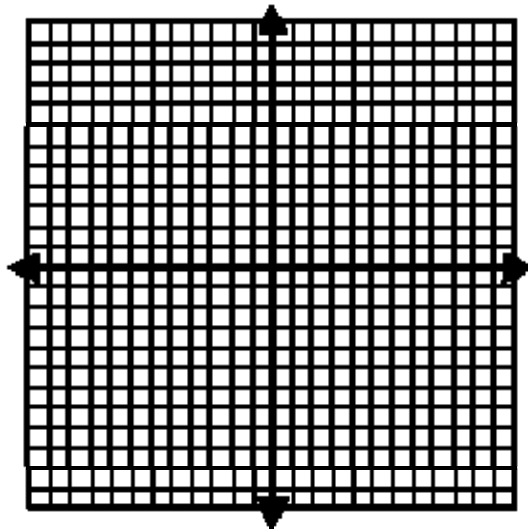


You can graph any equation with “x” and “y” in it by substituting in various numbers for “x” and finding the corresponding values of “y”.

x	$y = x^2 - 4$
0	
1	
2	
3	
-1	
-2	
-3	



x	$y = 2x + 3$
0	
1	
2	
3	
-1	
-2	
-3	

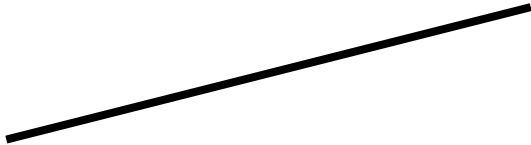
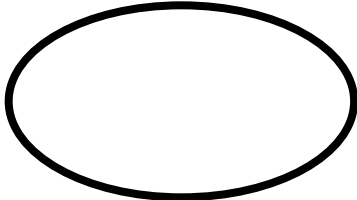
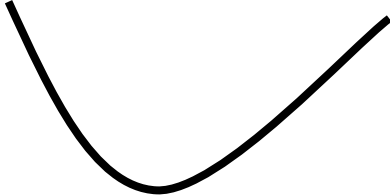
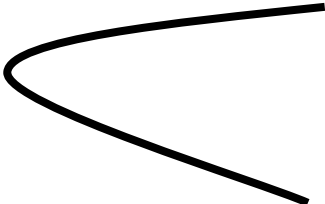


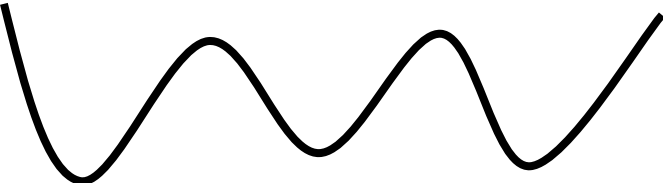
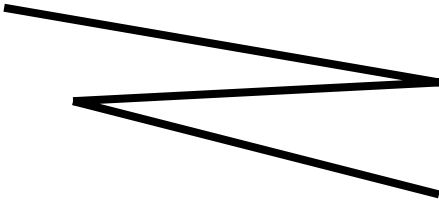


Most things you can graph are called **functions** in advanced mathematics.

- A function is basically just an equation that gives only one answer “y” for each given value of “x”.

Is a graph a function?

- You can tell using the **vertical line test**.
  - If every possible vertical line crosses the graph just once, **yes**—it is a function.
  - If any vertical line ever touches more than once, **no**—it is not a function

YES	NO
	
	
	
	

Function Notation ...

Functions are often written with notation that looks like this:

- $f(x) = 2x + 5$
- $g(x) = x^2$
- $h(x) = x^2 + 2x - 1$

$f(x)$  is read “f of x” and basically means “y”.

- These are basically giving you different formulas you can use to find “y”.
- We use  $f(x)$  and  $g(x)$  so we can tell the different formulas apart.

Typical problem ...

$$f(x) = 3x + 11$$

Find  $f(7)$

- This just means “plug in 7 for ‘x’ in the formula, and see what you get.”

$$f(x) = 3x + 11$$

$$f(7) = 3 \cdot 7 + 11$$

$$f(7) = 32$$

If

- $f(x) = 2x + 5$
- $g(x) = x^2$
- $h(x) = x^2 + 2x - 1$

Find ...

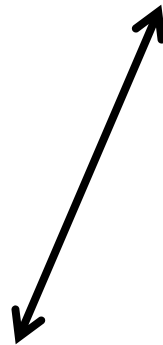
- $f(3)$
- $g(5)$
- $g(-4)$
- $h(6)$

#### LINEAR FUNCTIONS

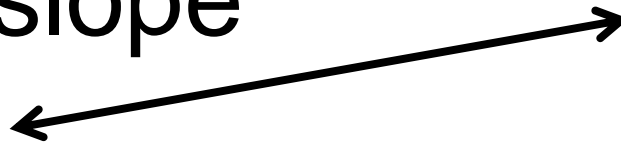
- Graph is a line

**Slope** → a fraction that tells the slant of a line

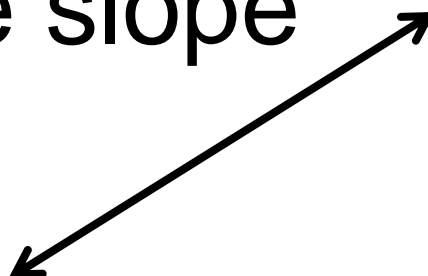
- **Big slope**



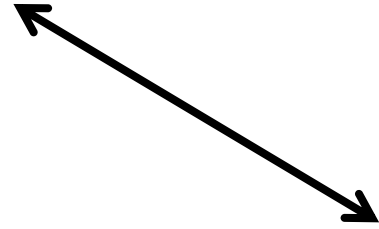
- **Small slope**



- **Positive slope**



- Negative slope



- Zero slope



- Undefined slope



If you know two points on a line, you can find the slope by using this formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Example: Find the slope of the line through (3,5) and (7,10).

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$m = \frac{10 - 5}{7 - 3} = \frac{5}{4}$$

Find the slope of the line through (4,9) and (-1,12)

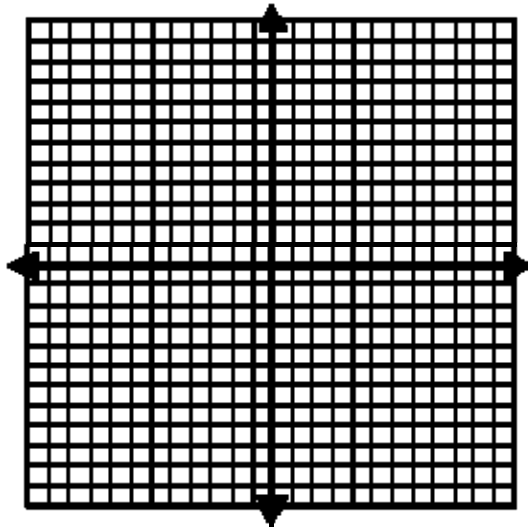
$$m = \frac{12 - 9}{-1 - 4} = \frac{3}{-5}$$

It's easy to use slope to graph linear functions.

- If a function is written in the form  $y = mx + b$  or  $f(x) = mx + b \dots$ 
  - $m$  (the number by  $x$ ) is the slope
  - $b$  (the number by itself) is the y-intercept, the place where the line crosses the y-axis.

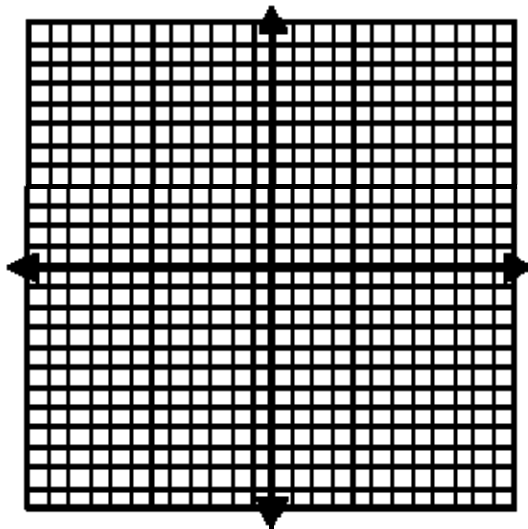
Example: Graph

$$y = \frac{2}{3}x + 5$$



Example: Graph

$$f(x) = \frac{1}{4}x - 2$$



Example: Graph

$$y = -3x + 4$$

