

## INTRODUCTION TO FUNCTIONS

- A **function** is a rule that is performed on a number, called an input, to produce a result called an output. The rule consists of one or more mathematical operations that are performed on the input.
  - An example of a function is  $y = 2x + 3$ , where  $x$  is the input and  $y$  is the output. The operations of multiplication and addition are performed on the input,  $x$ , to produce the output,  $y$ . By substituting a number for  $x$ , an output can be determined.



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corresponding values for  $y$ . These are then the coordinates of three points on the line, which can be plotted and connected to form the line.




## How to use introduction to functions

- A **function** is a rule that tells what needs to be done to an input to produce an output. If a rule says to divide by 2 and add 1, then those are the operations that must be performed on the input. In this case if the inputs were the numbers, 2, 4, and 6, the output would be:

Ex.	Input	Function	Output
	2	$\div 2 + 1$	2
	4	$\div 2 + 1$	3
	6	$\div 2 + 1$	4

- A function can also be noted as an equation,  $y =$  some operations performed on  $x$ , where  $x$  is the **input** and  $y$  is the **output**.



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- To determine output values, follow the x-axis to the input value and go up until a point on the graph is reached, this is the output value. To determine a rule, write all the input and output values in a table as above and find a correlation between the two, this would be the rule.

- **The equation of a line,  $y = mx + b$ , has three parts;** the slope,  $m$ ; the y-intercept,  $b$ ; and the point  $(x, y)$ . If the slope and y-intercept are given, the equation of a line can be found by plugging in the slope for  $m$  and the y-intercept for  $b$ .

- **Ex. What is the equation of a line with a slope of 5 and a y-intercept of -2?**

$$y = mx + b, \quad m = 5 \text{ and } b = -2 \rightarrow y = 5x - 2$$

- To find the **slope of a line**, the equation of a line must be in the form,  $y = mx + b$ . If an equation of a line is not in that form, it must be put into that form before the slope can be found. Ex. What is the slope of the line  $5x + y = 3$ ?

Ex.  $5x + y = 3$  needs to change to  $y = -5x + 3$

Once the equation is in the correct form, the slope is found, -5.

- A line with a negative slope is a line that is going downhill. A line with a positive slope is a line that is going uphill. A line with a zero slope is a horizontal line and a vertical line has an undefined slope. The y coordinates can also be found with the equation of a line by plugging in the x values and evaluating.

Try

What  
and

What  
6, 8

What



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input	1	2	3	4	5	6
output	3	6	9	12	15	18

What is the **equation of a line** with a slope of 2 and a y-intercept of 9?

The equation of a line is  $y = -2 + 6$ , what is the **slope**?