Lesson 6 - Linear Function and its graph. Slope of a line

Grade 9

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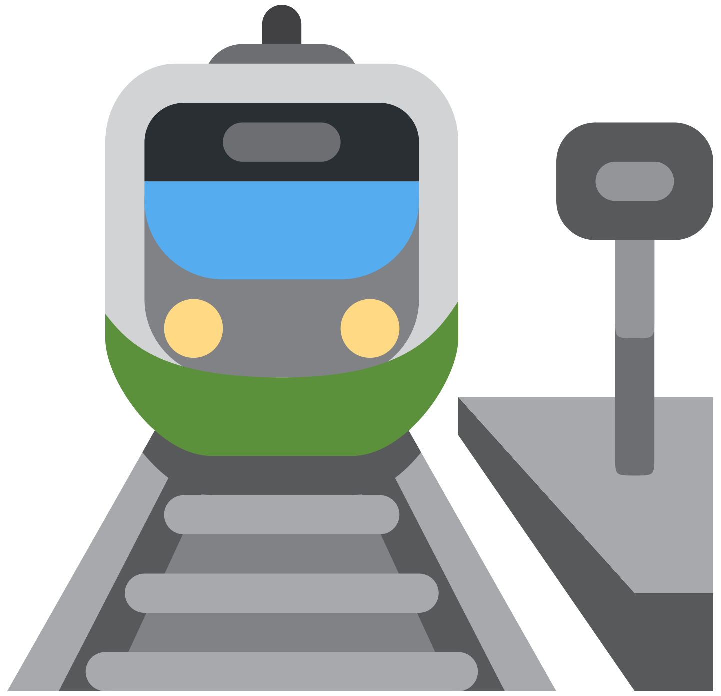
INTO MATH

LEARN IT FAST

A train is traveling at a speed of 50 km/h.
What distance will the train cover in t hours?



Let distance traveled be d (km).

Then **$d = 150t$**

Both distance and time are changing when the train is moving.

If time is 0.5 hours, then distance is $d = 150 \times 0.5 = 75$ km.

d depends on t, therefore **t - independent variable**

d - dependent variable

The relationship between t and d in the train problem is called a function.

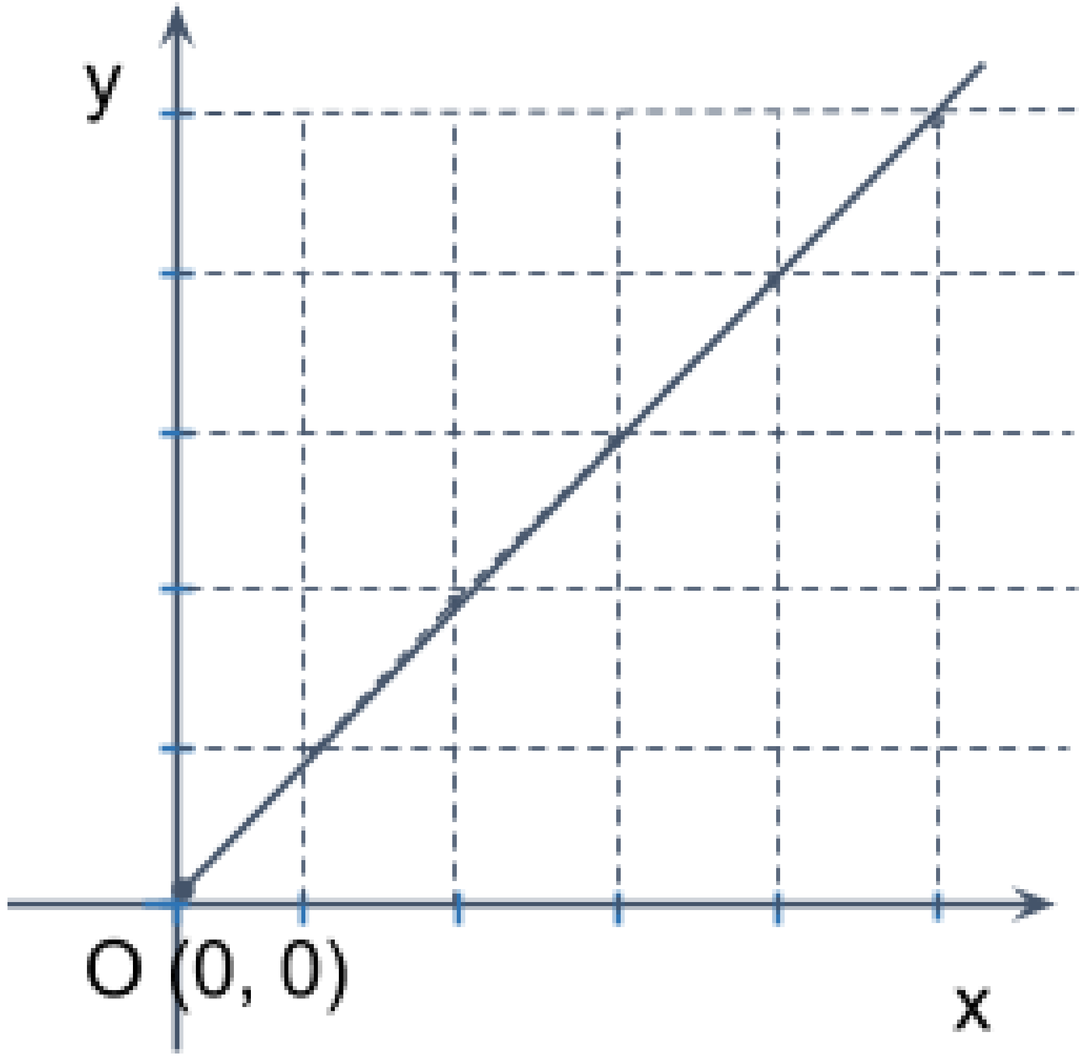
Usually we use x to represent an independent variable and y to represent a dependent variable.

x is an **argument**, y is a **function**.

A function could be given in 4 different ways:

- equation or formula
- graph
- table of values
- word problem

A GRAPH OF A FUNCTION is a set of ordered pairs of independent and dependent variables, that satisfy the function.



Graph of a function modeled by an equation $y = kx$, is a **straight line** that goes through the origin O (0, 0).

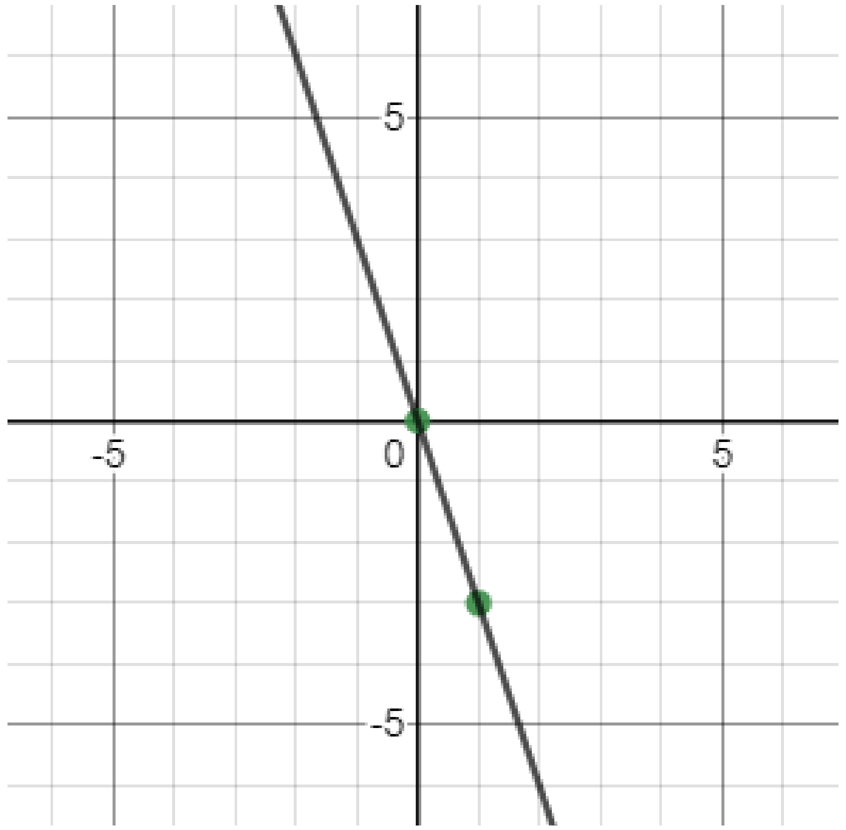
Function $y = kx$ is called a **direct proportion**.

Graph the function y = −3x

To graph a function, all you need is two points, which you will then connect to form a straight line

Create a table of values for the function, then graph the funciton

x	y
0	0
1	−3



A LINEAR FUNCTION is a function modeled by an equation $y = mx + b$, where m and b are given

The graph of a linear function is a straight line.

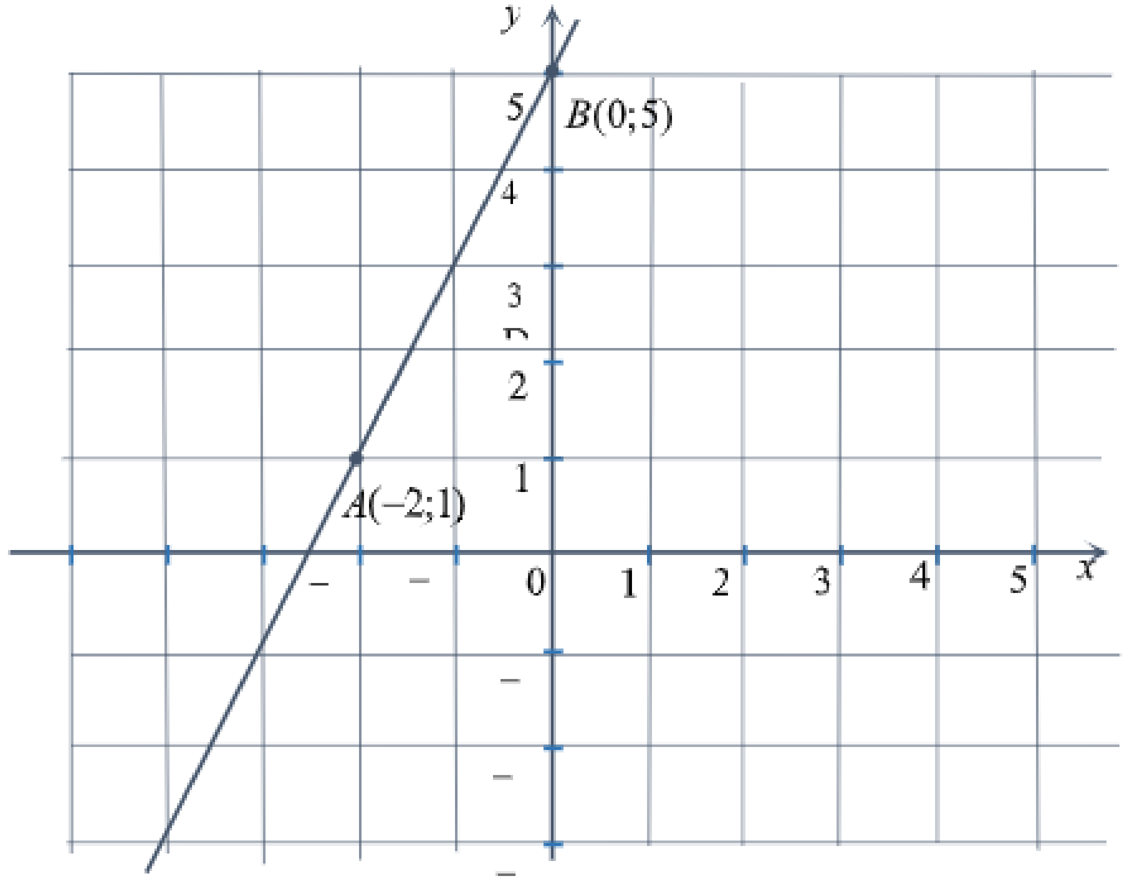
In order to graph this function, you need to determine two points that satisfy the function, plot these points and connect with a straight line.

Graph the function y = 2x + 5

- Create the table of values by selecting your own independent values and substituting them into the equation of the function to find the dependent values.

x	y
-2	1
0	5

If x = -2, then y = 2(-2) + 5 = 1
If x = 0, then y = 2(0) + 5 = 5



- Plot the points and connect with a line

SLOPE OF A LINE

Let A and B be the points on a line $A(x_1, y_1)$ $B(x_2, y_2)$

Then to determine the slope (steepness) of a line use the formula:

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

Determine the slope of a line given by the equation y = 2x + 5

$A(-2,1)$ $B(0,5)$ satisfy this equation, therefore

$$m = \frac{5-1}{0-(-2)} = \frac{4}{2} = 2$$

MOVE ON TO GRADE 9 LESSON 7