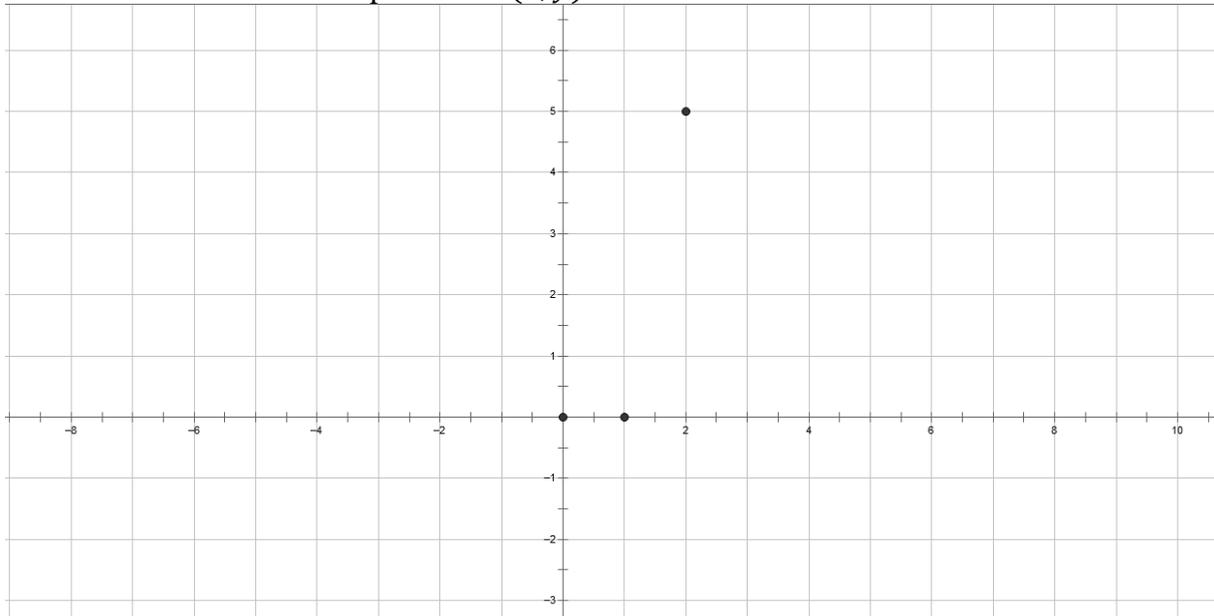




Cartesian coordinates

A Cartesian coordinate is expressed as (x, y) .



For example, the coordinates of the points marked above are $(0, 0)$, $(1, 0)$ and $(2, 5)$.

The horizontal axis is known as the x -axis, while the vertical axis is known as the y -axis.

Graphs of Linear Functions

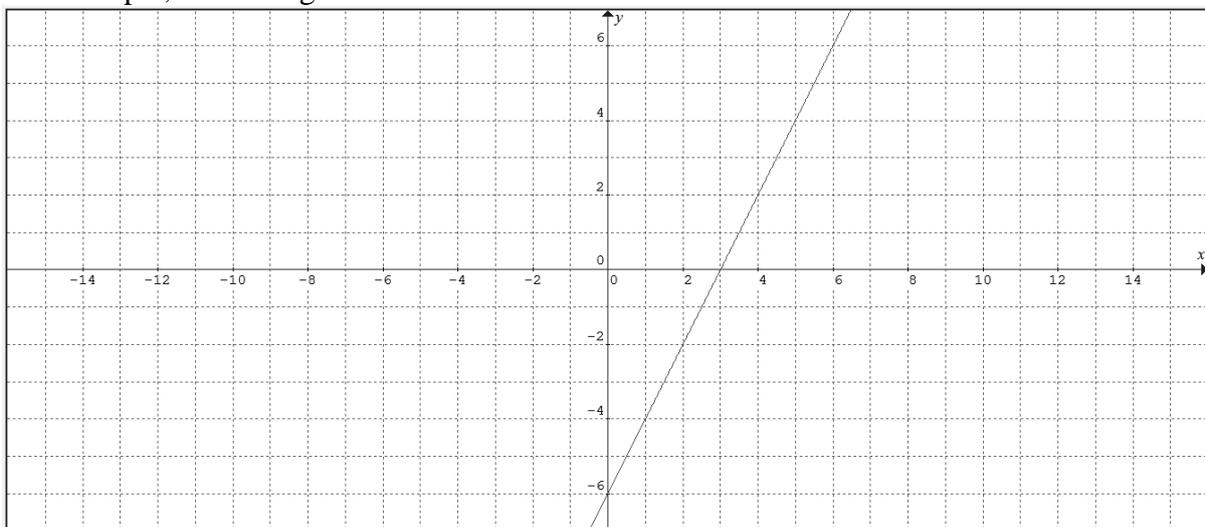
The graph of a linear function is a straight line.

It can be expressed as $y = mx + c$. m is the gradient whereas c is the y -intercept.

Gradient is calculated as $m = \frac{y_2 - y_1}{x_2 - x_1}$. $(y_2 - y_1)$ is taken as vertical change whereas $(x_2 - x_1)$ is taken as horizontal change. In this case, the line passes through (x_1, y_1) and (x_2, y_2) . The gradient of a straight line is the same, regardless of the x -value and the y -value.

To show that c is the y -intercept, let $x = 0$. Hence $y = c$.

For example, in the diagram below:



The line passes through the points $(6, 6)$ and $(0, -6)$. Hence, $m = \frac{0 - 6}{-6 - 6} = 2$.

The line intercepts the y -axis when $y = -6$.

Therefore, the equation of the line is $y = 2x - 6$.

The equation of the line can be verified by substituting the x - and y -values of the coordinates that the line passes through. For example, since the line passes through $(6, 6)$, $6 = 2(6) - 6$.

Length of Line Segment

The length of a line segment is given as $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

Practice: Find the distance between $(6, 6)$ and $(0, -6)$.

Extension: How is the formula associated to the Pythagoras' Theorem?

END