CHAPTER 6 THE CARTESIAN PLANE

Learning outcomes

At the end of this chapter, Learners will:

- Draw the XOY plane
- Plot and read the ordered pair (x, y) on the XOY plane
- Join different points on the Cartesian plane
- Graph straight lines

CONCISE INFORMATION

The XOY plane

There are two axes on the Cartesian plane: a horizontal axis and a vertical axis. The intersection of the two axes called the Origin. The horizontal axis is called the x-axis and has negative numbers on the left on the origin and positive numbers on the right of the origin. The vertical axis is called the y-axis and has negative numbers below the origin and has positive numbers above the origin.

The ordered pair (x, y) on the XOY plane

An ordered pair of numbers on the Cartesian plane are called coordinates. The coordinates (x, y) determine the position of a point on the XOY plane. The x is the number of units along the horizontal axis and the y is the number of units vertically. For example, the coordinates $(3, -4)$ means moving 3 units along the x −axis in the positive direction and then 4 units vertically in the negative direction (or downwards).
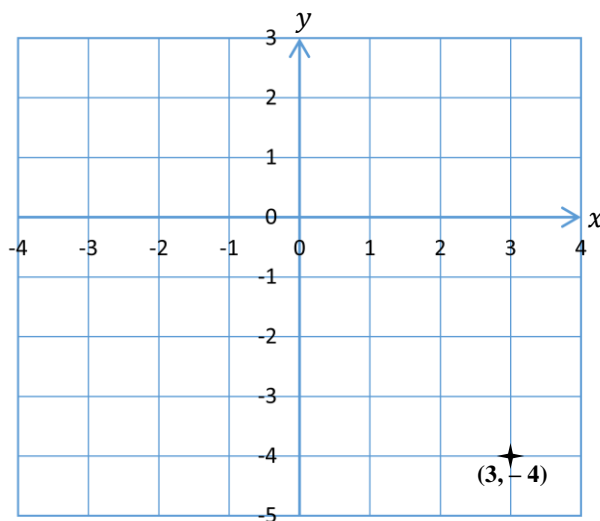
Points on the Cartesian plane

A point on the Cartesian plane is the intersection of a vertical line and a horizontal line. Points on the Cartesian plane can be joined to form different shapes: straight lines or two dimensional (plane) shapes. The straight obtained on the Cartesian plane can be described by a mathematical expression of an equation.
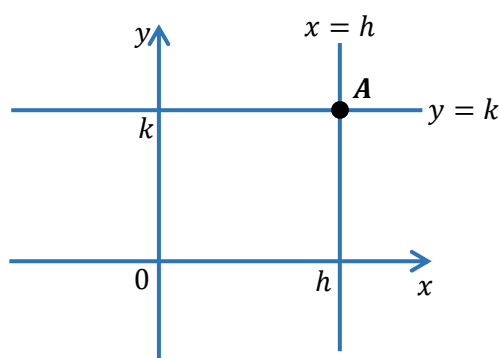
In the diagram below, the relationship between x and y values can be described as: the value of y is equal to the product of -1 multiplied by value of x. This results in a mathematical equation given by $y = -x$.
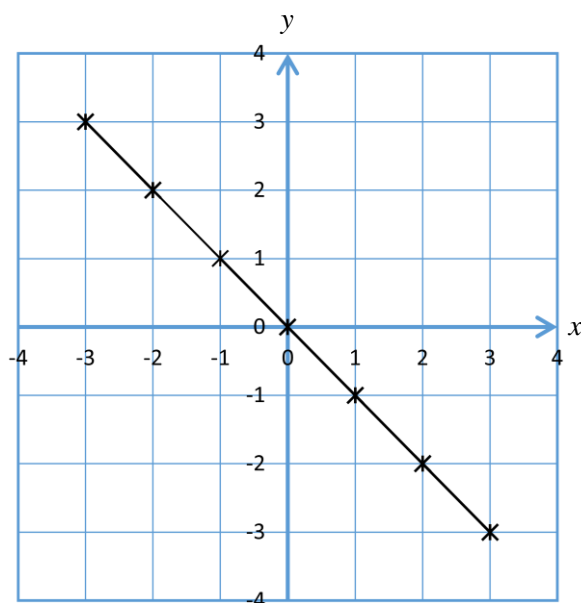
Graph of straight lines

The graph of the function $f(x) = k$ or $y = k$, where k is a real number, is a horizontal line and the graph of the function $x = h$, where h is a real number, is a vertical line.

If the horizontal line is above the x-axis the value of k is positive and it is negative if the line is below the x-axis. If the vertical line is to the right of the y-axis the value of h is positive and it is negative if the line is to the left of the y-axis.

Point A has coordinates,
$$A(h, k)$$