

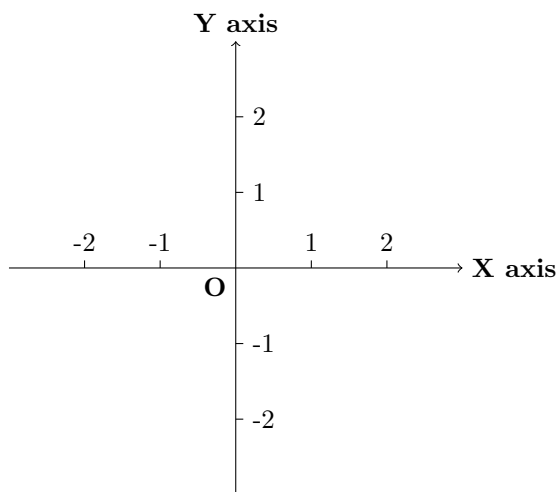
LINEAR EQUATION

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1 co-ordinate geometry

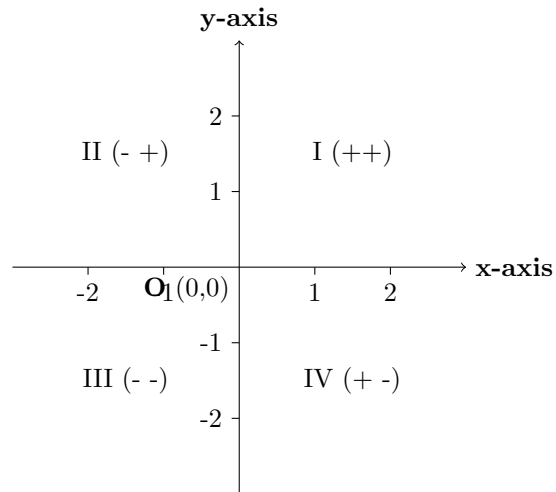
What is coordinate geometry? In coordinate geometry, graphs and coordinates are used to find information about different geometric figures. A definition of coordinate geometry must include a description of the coordinate plane. The coordinate plane, also called the coordinate graph, is a grid system created by the intersection of two number lines, called axes. The horizontal number line is the x-axis, and the vertical number line is the y-axis. These axes intersect at a point called the origin. See the labeled diagram of a coordinate plane below.



1.1 rectangular cartesian co-ordinate

In geometry, the cartesian coordinate system is a system that uses two axes, the x-axis and y-axis, to specify points in a plane. The cartesian coordinate system is also known as the rectangular coordinate system. It is named after René Descartes, who introduced it in 1637. The x-axis is the horizontal axis and the y-axis is the vertical axis. The point where the two axes intersect is

called the origin. The coordinates of a point are given as an ordered pair, (x,y). The x-coordinate is the distance from the origin to the point on the x-axis and the y-coordinate is the distance from the origin to the point on the y-axis.



2 linear equation***

An equation is a mathematical statement, which has an equal sign (=) between the algebraic expression. Linear equations are the equations of degree 1. It is the equation for the straight line.

example of linear equation

$$y + x = 1$$

$$y = 2x + 3$$

Non-linear equation

$$y^2 + x = 1$$

3 Equation of line***

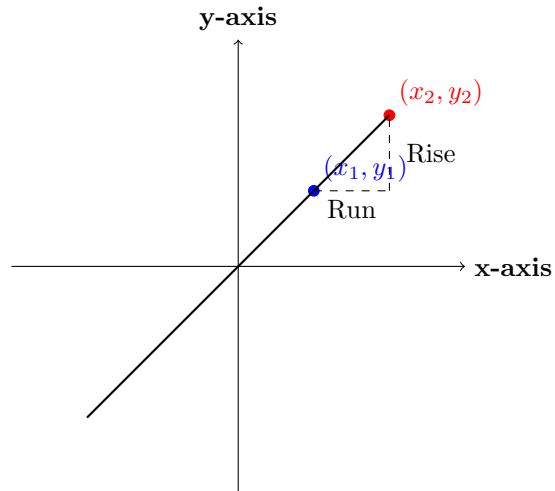
The equation of a straight line is

$$y = mx + c$$

where m = slope and c = Y intercept.

4 slope***

The slope of a line is the measure of the steepness and the direction of the line.



If you have two point

$$(X_1, Y_1) \text{ and } (X_2, Y_2)$$

the you can calculate the slope using this formula.

$$m = \left(\frac{y_1 - y_2}{x_1 - x_2} \right)$$

5 Straight line equation given a point and slope***

rule 1

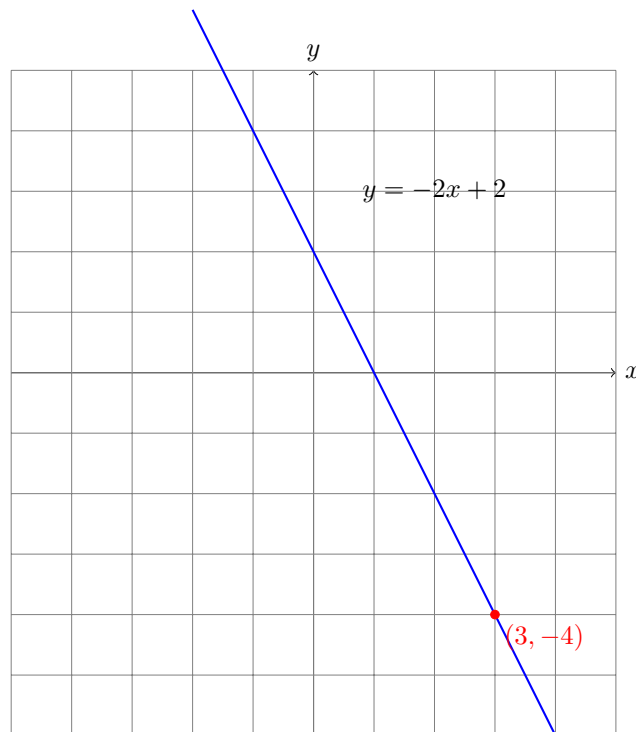
If you are given one point say

$$(x_1, y_1)$$

and a slope m . The equation of the straight line is

$$(y - y_1) = m * (x - x_1)$$

problem 1 Find the equation of the line with gradient -2 and that pass through the point (3, -4). **Graph of the line:**



solution

here:
 $m = -2$
 $x_1 = 3$
 $y_1 = -4$

then the required equation is:

$$y - (-4) = -2 * (x - 3)$$

$$y + 4 = 2x + 6$$

$$y = -2x + 2$$

problem

- 1) Find the equation of the line with gradient -2 and that pass through the point (3, -4).
- 2) Find the equation of the line with slope 3 and that pass through the point (-4, -4).

3) Determine the equation of the line that has a slope of 2 and passes through the point (5,6)

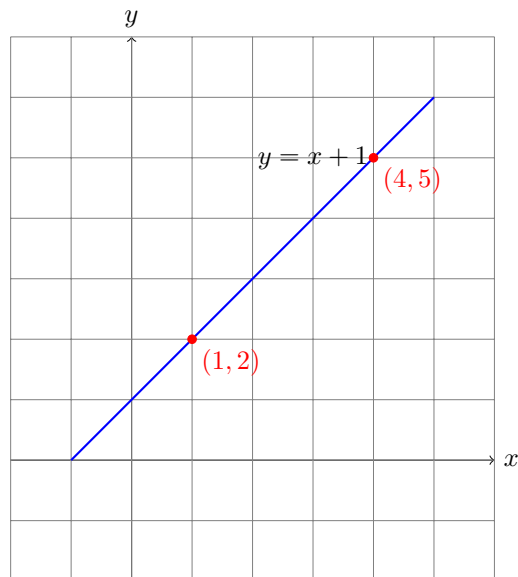
6 straight line from two points***

rule 2 If are given two points X_1, Y_1 and X_2, Y_2 then you have to follow the rule 2:

$$\frac{X - X_1}{X_2 - X_1} = \frac{Y - Y_1}{Y_2 - Y_1}$$

example 1

Find the equation of the straight line through the points 1, 2 and 4, 5. **Graph of the line:**



$$\frac{x - 1}{1 - 4} = \frac{y - 2}{2 - 5}$$

$$\frac{x - 1}{-3} = \frac{y - 2}{-3}$$

$$(x - 1) = (y - 2)$$

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

$$x - y + 1 = 0$$

problem

1) Find the equation of the straight line through the points (1, 2) and (4 , 5).

- 2) Find the equation of the straight line through the points $(-2, 2)$ and $(3, 7)$.
- 3) Find the equation of the straight line through the points $(-1, 2)$ and $(-4, 5)$.