Linear Equations in Two Variables

Framing a Linear Equation

Linear equation in one variable

When an equation has only one variable of degree one, then that equation is known as linear equation in one variable.

- Standard form: ax+b=0, where $a \; and \; b \in R \; \& \; a \neq 0$
- Examples of linear equation in one variable are :

  - 3x-9 = 0
  - 2t = 5

Linear equation in 2 variables

When an equation has two variables both of degree one, then that equation is known as linear equation in two variables.

Standard form: ax+by+c=0, where $a, b, c \in R \; \& \; a, b \neq 0$
Examples of linear equations in two variables are:

- 7x+y=8
- 6p-4q+12=0

Examples of a Linear Equations

Solution of linear equation in 2 variables

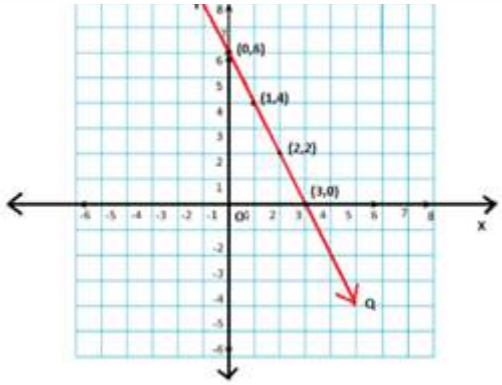
A linear equation in two variables has a pair of numbers that can satisfy the equations. This pair of numbers is called as the solution of the linear equation in two variables.

- The solution can be found by assuming the value of one of the variable and then proceed to find the other solution.
- There are infinitely many solutions for a single linear equation in two variables.

Graph of a Linear Equation

Graphical representation of a linear equation in 2 variables

- Any linear equation in the standard form ax+by+c=0 has a pair of solutions (x,y), that can be represented in the coordinate plane.
- When an equation is represented graphically, it is a straight line that may or may not cut the coordinate axes.



Solutions of Linear equation in 2 variables on a graph

- A linear equation ax+by+c=0 is represented graphically as a straight line.
- Every point on the line is a solution for the linear equation.
- Every solution of the linear equation is a point on the line.

Lines passing through origin

- Certain linear equations exist such that their solution is (0,0). Such equations when represented graphically pass through the origin.
- The coordinate axes x-axis and y-axis can be represented as y=0 and x=0 respectively.

Lines parallel to coordinate axes

- Linear equations of the form y=a, when represented graphically are lines parallel to the x-axis and a is the y-coordinate of the points in that line.
- Linear equations of the form x=a, when represented graphically are lines parallel to the y-axis and a is the x-coordinate of the points in that line.