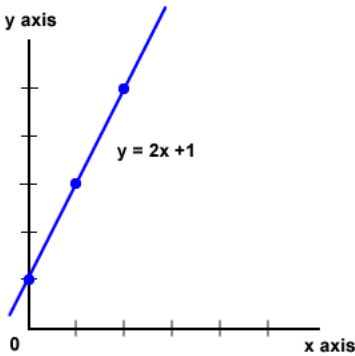


Graph of a Linear Equation in Two variables

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Linear Equation in two variables



An equation of the form $ax + by + c = 0$ or $ax + by = c$, where a, b, c are real numbers, $a \neq 0$, $b \neq 0$ and x, y are variables, is called a [linear equation in two variables](#).

Examples of linear equation in two variables :

- $x + 2y = 1$
- $-2x + 3y = 4$

Solution of Linear equation in two variables

Let $ax + by + c = 0$, where a, b, c are real numbers, $a \neq 0$, $b \neq 0$. Then, any pair of values of x and y which satisfies the equation $ax + by + c = 0$, is called a [solution](#) of it.

Example: $x = 3$, $y = 2$ is a solution of $3x - 2y = 5$ because when $x = 3$, $y = 2$, we have: $LHS = 3 \times 3 - 2 \times 2 = 5 = RHS$.

But, $x = 3$, $y = -2$ is not its solution, because $3 \times 3 - 2 \times (-2) \neq 5$ i.e. $LHS \neq RHS$ when $x = 3$ and $y = -2$.

Graph of a Linear Equation in two variables

In order to draw the graph of a linear equation $ax + by + c = 0$, $a \neq 0$, $b \neq 0$, we follow the steps written below :

Step I – Obtain the linear equation, Let the equation be $ax + by + c = 0$.

Step II – Express y in terms of x to obtain $y = \left(\frac{-ax + c}{b} \right)$

Step III – Give any two values to x and calculate the corresponding values of y from the expression in step II to obtain two solutions, say (1, 1) and (2, 2).

If possible take values of x as integers in such a manner that the corresponding values of y are also integers.

Step IV – Plot points (1, 1) and (2, 2) on a graph paper.

Step V – Join the points marked in step IV to obtain a line. The line obtained is the graph of the equation $ax + by + c = 0$.

Important Remarks

(i) When $a \neq 0$, $c \neq 0$ and $b = 0$

The equation $ax + by + c = 0$, reduces to $ax + c = 0$ or $x = -c/a$. In this case the graph of the equation $ax + by + c = 0$, is a straight line parallel to y – axis and passing through the point $(-c/a, 0)$

(ii) When $b \neq 0$, $c \neq 0$ and $a = 0$.

In this case, the equation $ax + by + c = 0$, is a straight line parallel to x – axis and passing through the point $(0, -c/b)$.

(iii) When $a \neq 0$, $b = 0$, $c = 0$.

The equation $ax + by + c = 0$ reduces to $ax = 0$ i.e. $x = 0$. The graph of this equation is y – axis.

(iv) When $a = 0$, $b \neq 0$, $c = 0$.

The equation $ax + by + c = 0$ reduces to $by = 0$ i.e. $y = 0$. The graph of this equation is x – axis.

(v) When $c = 0$.

The equation $ax + by + c = 0$ reduces to $ax + by = 0$. The graph of this equation is a line passing through the origin.

To get a more clear idea, let's explain with an example :

Example : Draw the graph of the equation $y - x = 2$.

We have, $y - x = 2$

$$y = x + 2$$

When $x = 1$, we have: $y = 1 + 2 = 3$

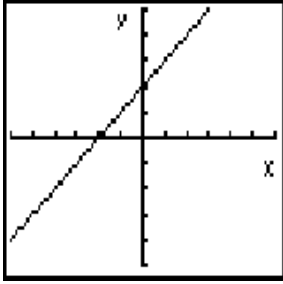
When $x = 3$, we have: $y = 3 + 2 = 5$

Thus, we have the following table exhibiting the abscissae and ordinates of points on the line represented by the given equation.

x	1	3
y	3	5

Plotting the points (1, 3) and (3, 5) on the graph paper and drawing a line joining them, we obtain the graph of the line represented

by the given equation as shown :



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Reference Links :

- http://en.wikipedia.org/wiki/Linear_equation#Linear_equations_in_two_variables
- http://en.wikipedia.org/wiki/System_of_linear_equations

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