



STUDY COURSE MATERIAL

MATHEMATICS SESSION-2020-21 CLASS- IX

TOPIC: LINEAR EQUATIONS IN TWO VARIABLES

DAY-1

❖ NCERT MATERIAL

<http://www.philoid.com/epub/ncert/9/124/iemh104?utm=com.ncert.chapter>

❖ TEACHING MATERIAL

❖ **Linear Equations**

The equation of a straight line is the linear equation. It could be in one variable or two variables.

❖ **Linear Equation in One Variable**

The equation with one variable in it is known as a **Linear Equation in One Variable**.

The general form is

$px + q = s$, where p , q and s are real numbers and $p \neq 0$.

Example

$$x + 5 = 10$$

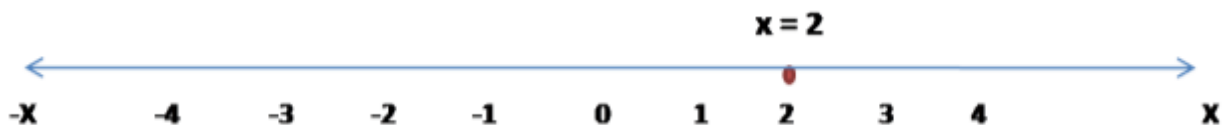
$$y - 3 = 19$$

These are called **Linear Equations in One Variable** because the highest degree of the variable is one.

❖ **Graph of the Linear Equation in One Variable**

We can mark the point of the linear equation in one variable on the number line.

$x = 2$ can be marked on the number line as follows -



❖ **Linear Equation in Two Variables**

An equation with two variables is known as a **Linear Equation in Two Variables**. The general form of the linear equation in two variables is

$$ax + by + c = 0$$

where a and b are coefficients and c is the constant. $a \neq 0$ and $b \neq 0$.

Example

$6x + 2y + 5 = 0$, etc.

❖ Slope Intercept form

Generally, the linear equation in two variables is written in the slope-intercept form as this is the easiest way to find the slope of the straight line while drawing the graph of it.

The slope-intercept form is

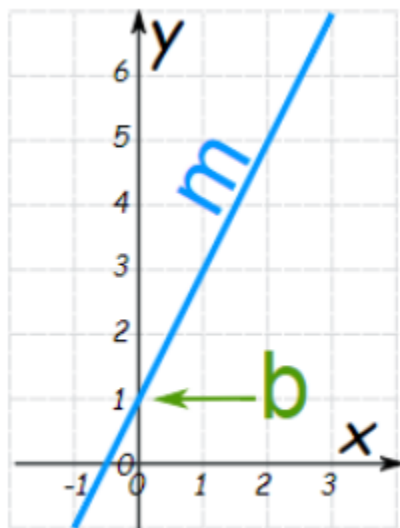
$$y = mX + b$$

❖

Slope (or Gradient) Y Intercept

Where m represents the slope of the line.

and b tells the point of intersection of the line with the y-axis.



Remark: If $b = 0$ i.e. if the equation is $y = mx$ then the line will pass through the origin as the y-intercept is zero.

❖ VIDEO-LINKS

LINK-1

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-1>

LINK-2

<https://youtu.be/loNxXYyIWg8>

❖ PPT LINKS

LINK-1

<https://www.slideshare.net/mobile/05092000/class-ix-linear-equations-in-two-variables>

LINK-2

https://edurev.in/studytube/LINEAR-EQUATION-IN-TWO-VARIABLES--PowerPoint-Prese/84a5a9de-a125-4255-ae9d-a93f34d8bd37_p

❖ DOCUMENTS LINK

<https://www.vedantu.com/cbse/important-questions-class-9-maths-chapter-4>

❖ GEO-GEBRA LINK

<https://www.geogebra.org/m/UFKyBtMm>

DAY-2

❖ TEACHING MATERIAL

Solution of a Linear Equation

- There is only one solution in the linear equation in one variable but there are infinitely many solutions in the linear equation in two variables.
- As there are two variables, the solution will be in the form of an ordered pair, i.e. (x, y).
- The pair which satisfies the equation is the solution of that particular equation.

Example:

Find the solution for the equation $2x + y = 7$.

Solution:

To calculate the solution of the given equation we will take $x = 0$

$$2(0) + y = 7$$

$$y = 7$$

Hence, one solution is (0, 7).

To find another solution we will take $y = 0$

$$2x + 0 = 7$$

$$x = 3.5$$

So another solution is (3.5, 0).

Graph of a Linear Equation in Two Variables

To draw the graph of linear equation in two variables, we need to draw a table to write the solutions of the given equation, and then plot them on the Cartesian plane.

By joining these coordinates, we get the line of that equation.

- The coordinates which satisfy the given Equation lies on the line of the equation.
- Every point (x, y) on the line is the solution $x = a, y = b$ of the given Equation.

- Any point, which does not lie on the line AB, is not a solution of Equation.

Example:

Draw the graph of the equation $3x + 4y = 12$.

Solution:

To draw the graph of the equation $3x + 4y = 12$, we need to find the solutions of the equation.

Let $x = 0$

$$3(0) + 4y = 12$$

$$y = 3$$

Let $y = 0$

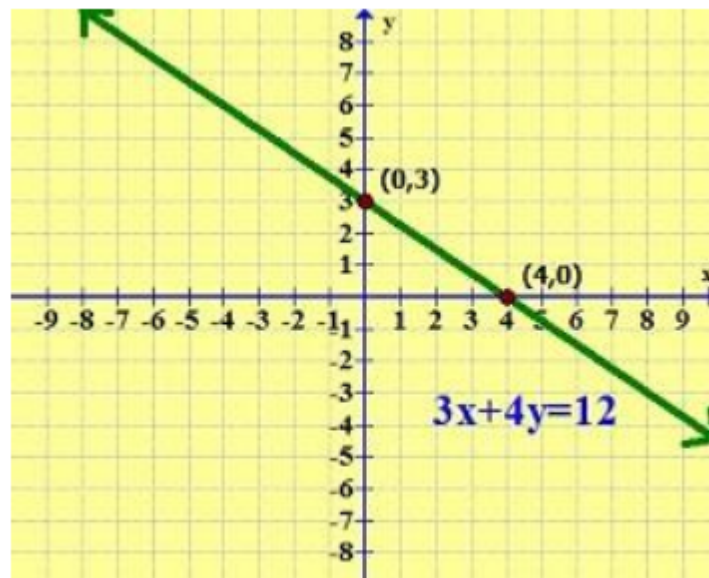
$$3x + 4(0) = 12$$

$$x = 4$$

Now draw a table to write the solutions.

x	0	4
y	3	0

Now we can draw the graph easily by plotting these points on the Cartesian plane.



❖ VIDEO-LINKS

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs/x2f8bb11595b61c86:two-variable-linear-equations-intro/v/2-variable-linear-equations-graphs>

DAY-3

❖ TEACHING MATERIAL

Equations of Lines Parallel to the x-axis and y-axis

When we draw the graph of the **linear equation in one variable** then it will be a point on the number line.

$$x - 5 = 0$$

$$x = 5$$

This shows that it has only one solution i.e. $x = 5$, so it can be plotted on the number line.

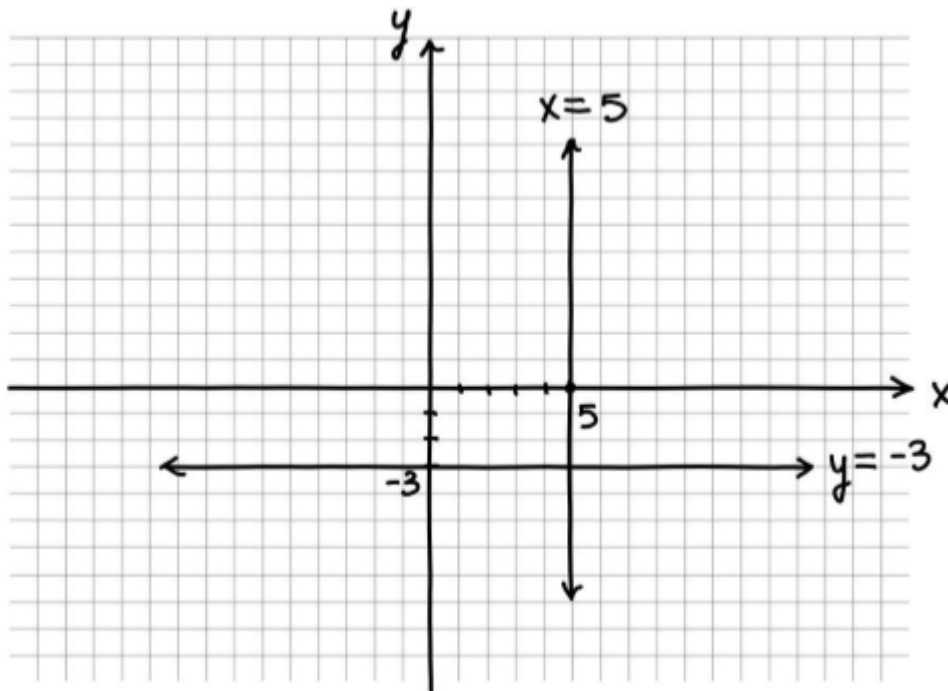
But if we treat this equation as **the linear equation in two variables** then it will have infinitely many solutions and the graph will be a straight line.

$$x - 5 = 0 \text{ or } x + (0)y - 5 = 0$$

This shows that this is the linear equation in two variables where the value of y is always zero. So the line will not touch the y -axis at any point.

$x = 5$, $x = \text{number}$, then the graph will be the vertical line parallel to the y -axis.

All the points on the line will be the solution of the given equation.



Similarly if $y = -3$, $y = \text{number}$ then the graph will be the horizontal line parallel to the x -axis.

❖ VIDEO-LINKS

LINK 1

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-2>

LINK 2

<https://www.khanacademy.org/math/in-in-grade-9-ncert/xfd53e0255cd302f8:in-in-chapter-4-linear-equations-in-two-variables/xfd53e0255cd302f8:in-in-graph-of-a-linear-equation-in-two-variables/v/graphs-of-linear-equations>

❖ PPT LINK

<https://www.slideshare.net/mobile/05092000/class-ix-linear-equations-in-two-variables>

EXERCISE:

- The graph of the equation $y-2= 0$ is:
 - Parallel to y-axis
 - Parallel to x-axis
 - Passes through origin
 - parallel neither to x-axis nor to y-axis
- The equation of x-axis is:
 - $Y = 0$
 - $x = 0$
 - $X = Y$
 - $x = a$
- The angle made by the line $y= x$ to the x-axis is:
 - 0°
 - 30°
 - 45°
 - 90°
- Every linear equation in two variables has:
 - No solution
 - Infinite number of solution
 - One solution
 - two solution
- Straight line passes through the points (1, 6), (0, 4) and (-2, 0) has equation:
 - $2x - y = -4$
 - $x - 2y = -4$
 - $2x + y = 4$
 - $x + 2y = 4$
- Straight lines represented by linear equations $x - y = 2$ and $3x - 2y = 7$ intersect at the point:
 - (1, 1)
 - (1, 3)
 - (2, 2)
 - (3, 1)
- The equation of y-axis is:
 - $Y = 0$
 - $x = 0$
 - $X = Y$
 - $x = a$
- The angle made by the line $y = -x$ to the x-axis is:
 - 0°
 - 30°
 - 45°
 - 90°
- Find two solutions for the linear equation $3x + 2y = 16$.
- Find the value of 'm', if (3, 4) is the solution of equation $5x - 2y = m$.

ONLINE TEST LINK

LINK 1

<https://physicscatalyst.com/testprep/class-9-math-online-tests/>

LINK 2

<https://unacademy.com/goal/cbse-class->

[9/SUVLV?utm_source=google&utm_medium=cpc&utm_campaign=9849223806&utm_term=%2Bclass%20%2B9%20%2Btest&utm_content={content}&gclid=Cj0KCQjwncT1BRDhARIsAOQF9LniTzb6cgV-zLQ75cvw89VeSjpPHSSlgz7Nat1_JR1mTNk-0PTWAKMaAsXGEALw_wcB](https://www.google.com/search?q=9/SUVLV?utm_source=google&utm_medium=cpc&utm_campaign=9849223806&utm_term=%2Bclass%20%2B9%20%2Btest&utm_content={content}&gclid=Cj0KCQjwncT1BRDhARIsAOQF9LniTzb6cgV-zLQ75cvw89VeSjpPHSSlgz7Nat1_JR1mTNk-0PTWAKMaAsXGEALw_wcB)