MIND MAP

Linear Equations

Equations of the form ax+by+c = 0

Where

x, y are variable

a, b, c are constants

$a \neq o,\, b \neq o$

Linear Equations in Two Variables

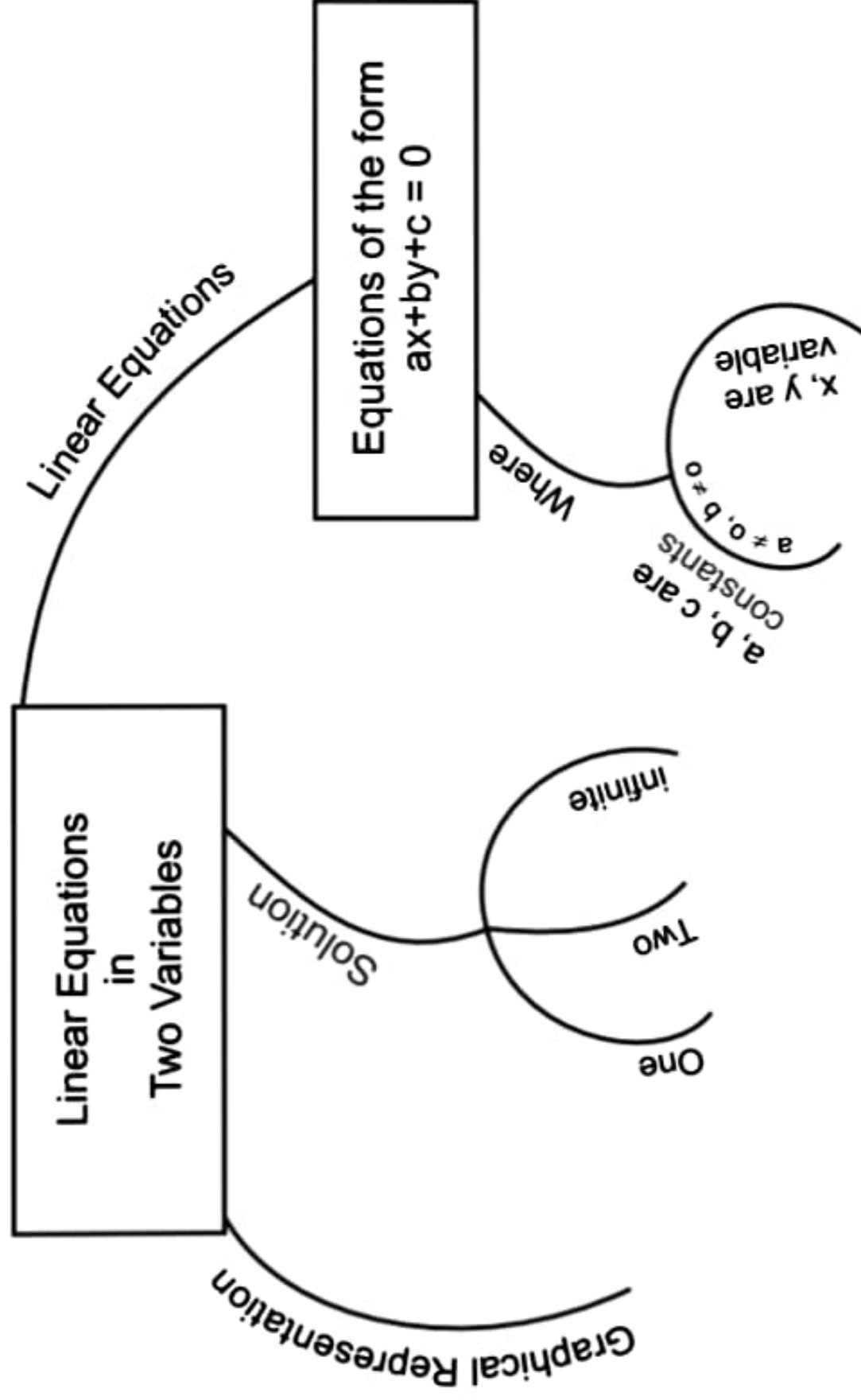Solution

One

Two

Infinite

Graphical Representation

LINEAR EQUATIONS IN 2 VARIABLE

- **What is Linear Equation?** → "Equation of a straight line is called linear equation."

▶ **Linear Equation in One Variable :**

The equation with only one variable in it is called linear equation in One variable.

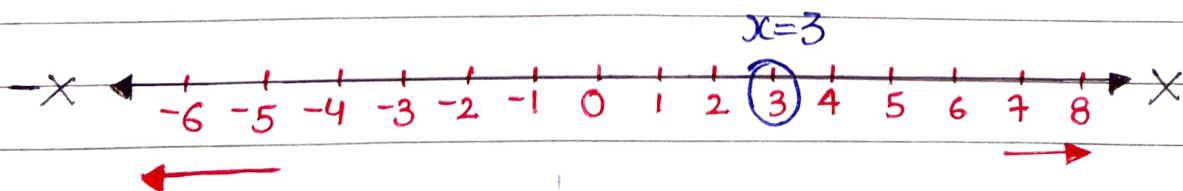■ **General form :** $ax + b = 0$, $a \neq 0$ and a, b are real numbers.

■ **Example :** $x + 5 = 10$, $2x + 6 = 3$

here you can see highest degree of variable is one. ($\because$ degree means power)

▶ **Graph of Linear equation in One variable :**

We can easily plot graph of linear equation in one variable on the number line.
Like we can mark $x = 3$ on number line.

$x = 3$

■ Linear Equation in two variables :

Any Equation which can be put in the form $ax+by+c=0$
where a, b and c are real numbers and $a,b \neq 0$
is called linear equation in two variables.
basically here two variables are present.

>> **General form** ⟹ $ax+by+c=0$

>> **Example** ⟹ $3x+2y+5=0$, $4x+9y-6=0$ etc.

■ Solution of a Linear Equation :

● Linear equation in one variable has only one and
Unique Solution.
$$ax+b=0 \Rightarrow \boxed{x=\frac{-b}{a}}$$

● Linear equation in two variables has infinitely many
Solution and in the form of (x,y).

✳● Every point on the line satisfies the equation of
the line.

Example Find the Solution of equation $3x+y=6$.

Ans As it is Linear eqn in 2 Variable, it has infinitely
many Solutions, Some of them, we can find as

let take $x=0$	let take $y=0$
$3(0)+y=6$	$3x+0=6$
$y=6$	$x=2$
then $(0,7)$	So, $(2,0)$ is another solution
is solution	

■ **Graph of linear equation in two variables :**

To draw graph of linear equation in two variable we just need to plot solution of given equation on cartesian plane (← chapter 3)

__Example__   Draw the graph of equation $2x + 3y = 12$

__Solution__   To draw graph, we just need solutions of above equation,

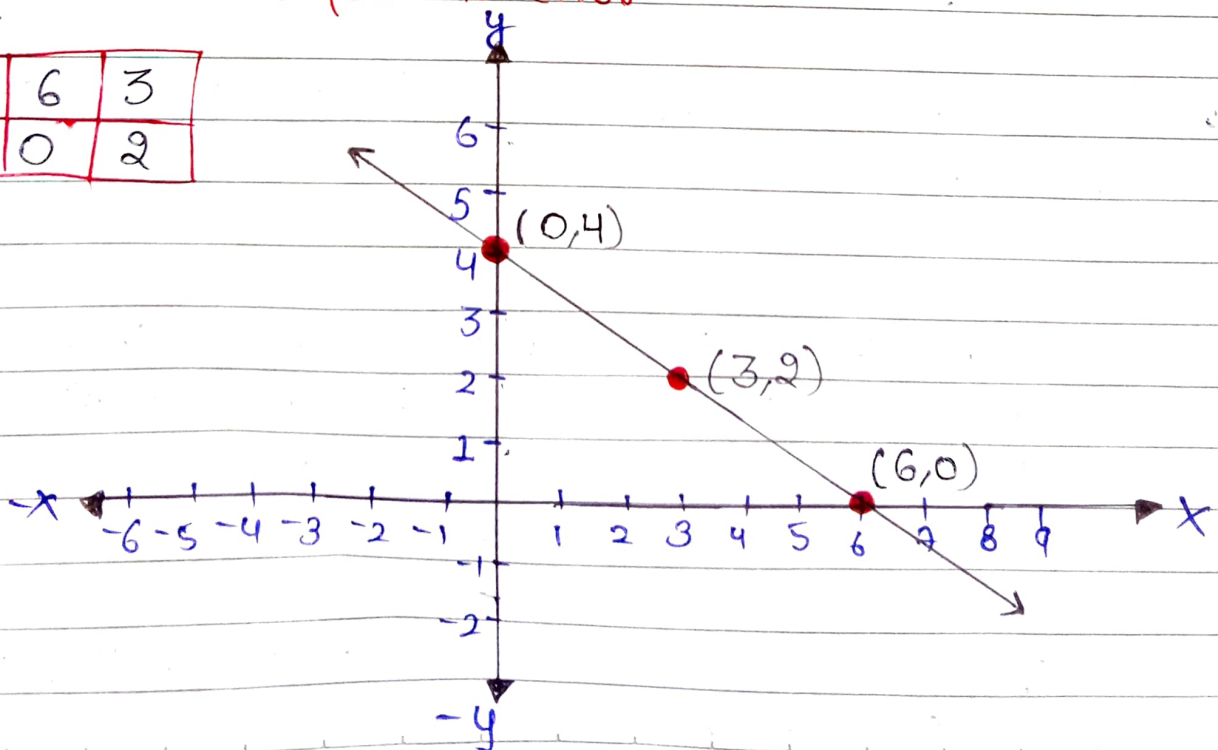| let $x = 0$	let $y = 0$	let $x = 3$
$2(0) + 3y = 12$	$2x + 3(0) = 12$	$2(3) + 3y = 12$
$\boxed{y = 4}$	$\boxed{x = 6}$	$3y = 12 - 6$
		$3y = 6$
		$\boxed{y = 2}$

Well, we just need atleast two solution to plot graph but I always recommend to find three solution minimum for no error.

Table →

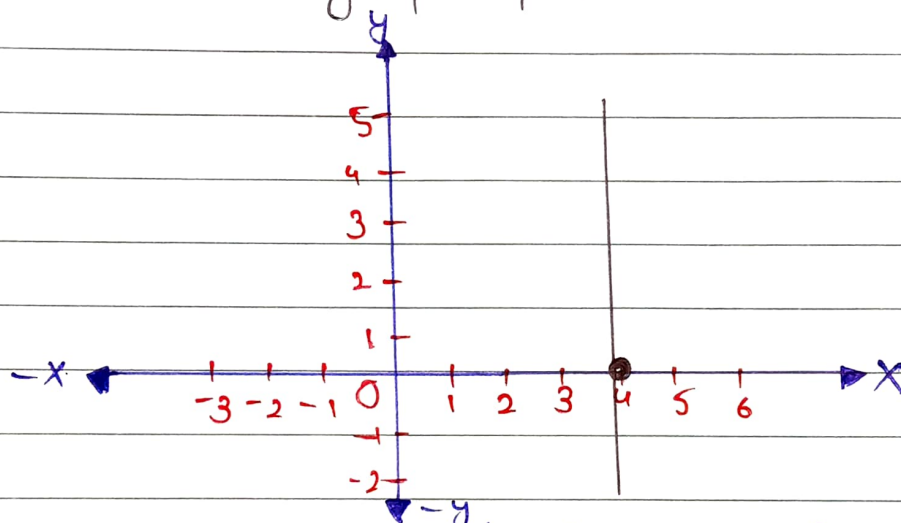| x	0	6	3
y	4	0	2

(0,4)

(3,2)

(6,0)

■ Equations of Lines Parallel to x-axis and y-axis :

⟹ Simply $x = a$ will be parallel to y axis
and $y = a$ will be parallel to x axis
where a is any constant (number)

Example : Plot the graph of $x = 4$

As we can see clearly $x = 4$ is parallel to
y axis. Similarly $\boxed{y = a}$ (any number) will be
parallel to x-axis.

" NOW GO AND PRACTICE MCQ "

PART–A

1. Which of the following is not a linear equation ?

   a) $3x+3 = 5x + 2$

   b) $x^2 + 5 = 3x - 5$

   c) $\frac{7}{3}x - 5 = 4x - 3$

   c) $(x+2)^2 = x^2 - 8$

2. Which of the following is not a linear equation in two variables ?

   a) $2x+3y = 5$

   b) $3x + 2y = 6$

   c) $ax^2 + by = c$

   d) $ax + by = c$

3. A linear equation in two variables has maximum

   a) Only one solution

   b) Two solution

   c) Infinite solution

   d) None of these

4. The graph of $ax+by+c = 0$ is

   a) a straight line parallel to x-axis

   b) a straight line parallel to y-axis

   c) a general straight line

   d) Name of these

5. If $x = 1, y = 1$ is a solution of equation $9ax + 12ay = 63$, then the value of a is

   a) 3   b) 0   c) -3   d) 4

6. The equation of x-axis is

   a) $x = k$ b) $x = 0$ c) $y = k$ d) $y = 0$

7. Any point on the line $y=x$ is of the form

   a) $(a, 0)$ b) $(0, a)$ c) (a, a) d) $(a, -a)$

8. $x = 0$ represents the equation of

   a) x-axis   b) y-axis

   c) a line parallel to x-axis

   d) a line parallel to y-axis

9. $x=2, y=3$ is a solution of the linear equation

a) $2x + y = 8$ b) $x + 2y = 8$

c) $x + y = 8$ d) $-x + y = 8$

10. The graph of $2x + 3y = 6$ is a line which meets the y-axis at the point ?

a) $(2,0)$ b) $(3,0)$ c) $(0,2)$ d) $(0,3)$

11. How many linear equations in x and y can be formed by $x = 18$ and $y = 4$?

a) only one b) two

c) three d) infinitely many

12. The point of the form $(-a, a)$ always lie on

a) $x = a$ b) $y = -a$

c) $y = x$ d) $x + y = 0$

13. The graph of $y = x$ passes through the point ?

a) $\left(\frac{5}{2}, -\frac{5}{2}\right)$ b) $\left(0, \frac{5}{2}\right)$

c) $(1,1)$ d) $\left(-\frac{1}{2}, \frac{1}{2}\right)$

14. Graph of $x = 5$ is a line

a) Parallel to x - axis

b) Parallel to y - axis

c) Passes through origin

d) Lying on x- axis

15. Any solution of the linear equation $5x+0y+7=0$ in two variables is of the form

a) $\left(0, -\frac{7}{5}\right)$ b) $\left(-\frac{7}{5}, 0\right)$

c) $\left(-\frac{7}{5}, k\right)$ d) $\left(k, -\frac{7}{5}\right)$

16. Any point on the x-axis is of the form

a) (x, y) b) (o, y)

c) (o, x) d) (x, o)

17. Solution of the equation $3x - y = 3$ is
   a) $(0, -3)$ b) $(2, 3)$
   c) $(3, 6)$ d) All of these

18. The coefficient of the variable y in linear equation $5(2x-y) + 3x + 4y - 7 = 0$ is
   a) -1   b) -9
   c) 13   d) 9

19. If a linear equation has solutions $(-1,1)$, $(0, 0)$, $(2, -2)$, then its equation is
   a) $y - x = 0$ b) $x + y = 0$
   c) $-2x + y = 0$ d) $-x + 2y = 0$

20. The point $(a, -a)$ does not lie on the graph of
   a) $x = a$ b) $y = -a$
   c) $y = x$ d) $x + y = 0$

21. Which of the following equations represents a line parallel to x-axis ?
   a) $2x + 3 = 0$ b) $2y + 2 = 0$
   c) $2x + 3y = 0$ d) $2x - 3y = 0$

22. Which of the following equations represents a line parallel to y-axis ?
   a) $2x = 3y$ b) $2y = 4$
   c) $2x = 4$ d) $2x - 3y = 9$

23. If $(a, -2)$ lies on the graph of $3x - y = 10$, then the value of a is
   a) 4   b) $\frac{8}{3}$

   c) 0   d) 1

24. The equation $2x + 9 = 0$ on number line is represented by :
   a) a line   b) a point
   c) Infinitely many lines   d) Infinitely many points

25. The distance between the graphs of the equations $x = -4$ and $x = 1$ is
   a) 1   b) 5
   c) 3   d) None of these

26. The distance between the graphs of the equations $y = -2$ and $y = -5$

 a) 7
 b) 3
 c) −7
 d) None

27. If $(2k-1, k)$ is a solution of the equation $10x - 9y = 12$, then $k =$ _____

 a) 1
 b) 2
 c) 3
 d) 4

28. Which of the following equations passes through the origin ?

 a) $x + y = 2$
 b) $x - y = 2$
 c) $2x - 3y = 0$
 d) None of these

29. If the equation $3y = 7$ is expressed as $ax + by + c = 0$ then which of the following is correct ?

 a) $a = 0, b = 7, c = 3$
 b) $a = 3, b = 0, c = -7$
 c) $a = 0, b = 3, c = -7$
 d) $a = 3, b = -7, c = 0$

30. On expressing x in terms of y for the linear equation $\frac{2}{3}x + 4y = -7$
 Which of the following is correct ?

 a) $y = \dfrac{-21 - 12x}{2}$
 b) $x = \dfrac{-21 - 12y}{2}$

 c) $y = -7 + \frac{2}{3}x$
 d) $x = -7 + 4y$

ANSWER

1. b) $x^2 + 5 = 3x - 5$
2. c) $ax^2 + by = c$
3. c) Infinite solution
4. c) a general straight line
5. a) 3
6. d) $y = 0$
7. c) (a, a)
8. b) y-axis
9. b) $x + 2y = 8$
10. c) $(0,2)$
11. d) infinitely many
12. d) $x + y = 0$
13. c) $(1,1)$
14. b) Parallel to y - axis
15. c) $\left(-\frac{7}{5}, k\right)$
16. d) (x, o)
17. d) All of these
18. a) -1
19. b) $x + y = 0$
20. c) $y = x$
21. b) $2y + 2 = 0$
22. c) $2x = 4$
23. b) $\frac{8}{3}$
24. b) a point
25. b) 5
26. b) 3
27. b) 2
28. c) $2x - 3y = 0$
29. c) $a = 0, b = 3, c = -7$
30. b) $x = \frac{-21 - 12y}{2}$