Linear Equations

(1) An equation of the form $ax + by + c = 0$, where a, b, c are real numbers such that a and b not both zero is called a linear equation in two variables.
For Example: $2x + 3y + 5 = 0$, where a = 2, b = 3 which are not zero. So this is linear equation in two variables.

(2) A linear equation in two variables has infinitely many solutions.
For Example: we have $4x - y - 3 = 0$, there is many solution
If we take x = 1, y = 1 then LHS = $4 \times 1 - 1 - 3 = 0$ = RHS
If we take x = 2, y = 5 then LHS = $4 \times 2 - 5 - 3 = 0$ = RHS

(3) The graph of a linear equation in two variables is a straight line.
For Example:
x + y = 4
We have $x + y = 4 \Rightarrow y = 4 - x$
When x=0, we have: y = 4 – 0 = 4
When x=2, we have: y = 4 – 2 = 2
When x=4, we have: y = 4 – 4 = 0
Thus, we have the following table:

X	0	2	4
Y	4	2	0

Plotting the points (0, 4) (2, 2) and (4, 0) on the graph paper and drawing a line joining them.
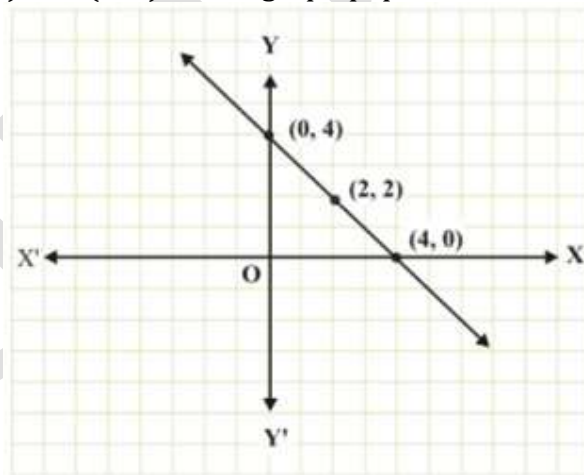
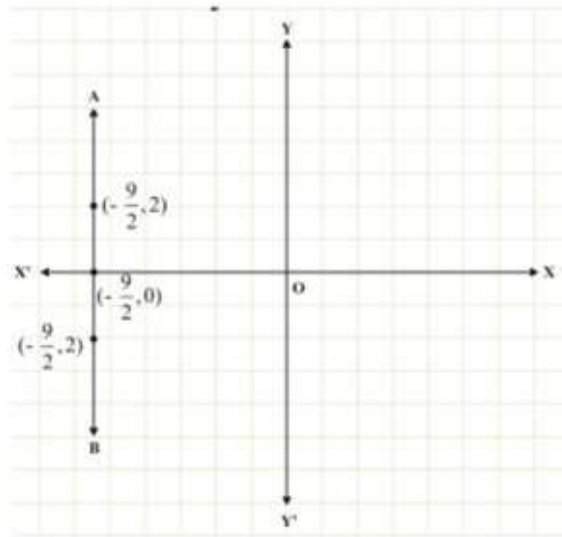**(4) The equations of x and y - axes are $y = 0$ and $x = 0$ respectively.**
For Example:
$x + 3 = 0$ equation is for x-axes because in this equation y = 0.
$7y - 3 = 0$ equation is for y-axes because in this equation x = 0.

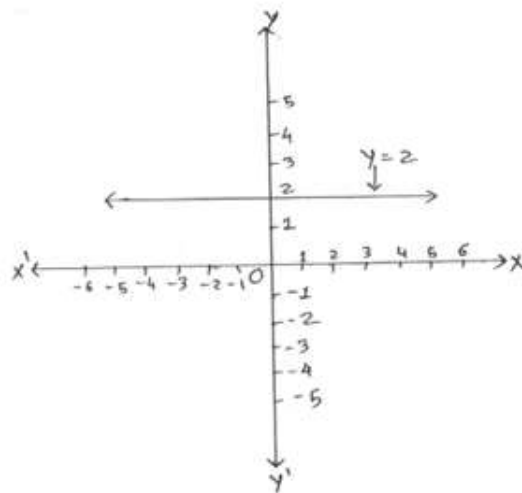**(5) The graph of the equation x = a is a straight line parallel to y-axis.**
For Example:
The equation for such a line $x = -\dfrac{9}{2}$ is given below:

(6) The graph of the equation y = a is a straight line parallel to x-axis.
For Example: For a line that is parallel to the x-axis, the equation for such a line y = 2 is given below:

(7) Every point on the graph of a linear equation in two variables is a solution of the equation. Conversely, every solution of linear equation in two variables represents a point on the graph of the equation.
For Example: In linear equation f(x) = x + 2y − 1 = 0, (3−1) also lies on this line.