Pair of Linear Equations in Two Variables

Syllabus

- Pair of linear equations in two variables
- Graphical method of their solution
- Consitency / Inconsistency
- Algebraic conditions for number of solutions.
- Solving methods — (a) By substitution
  (b) By elimination
- Simple situational problems.

Pair of Linear Equations in Two Variables.

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The General foom of pair of linear equations in two variables x and y is -

$$a_1x+b_1y+c_1=0$$
$$a_2x+b_2y+c_2=0$$

where $a_1, b_1, c_1, a_2, b_2, c_2$ are all real numbers and $a_1^2+b_1^2 \neq 0$, $a_2^2+b_2^2 \neq 0$.

Graphical method of their solution

of two equations given, $a_1x+b_1y+c_1=0$, $a_2x+b_2y+c_2=0$

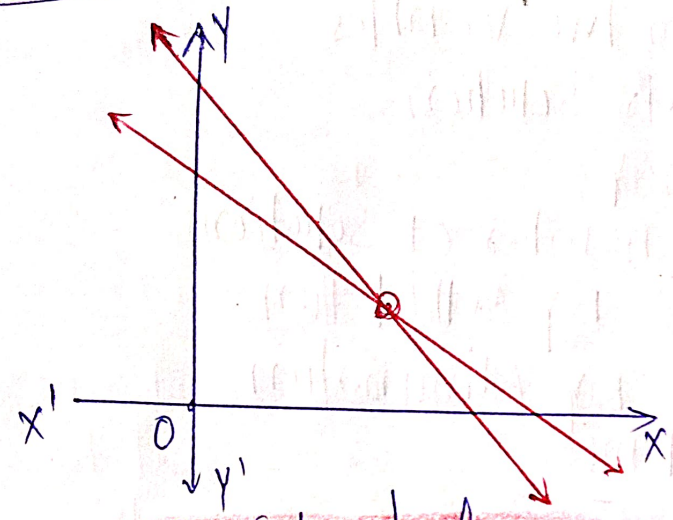
step 1.> put in both the equations $x=0$, find y co-ordinate and $y=0$, find x-co-ordiate.

step 2.> find the intersection point of these equation and draw the graph.

step 3.> The common point will be the final solution.

Consistency and Inconsistent

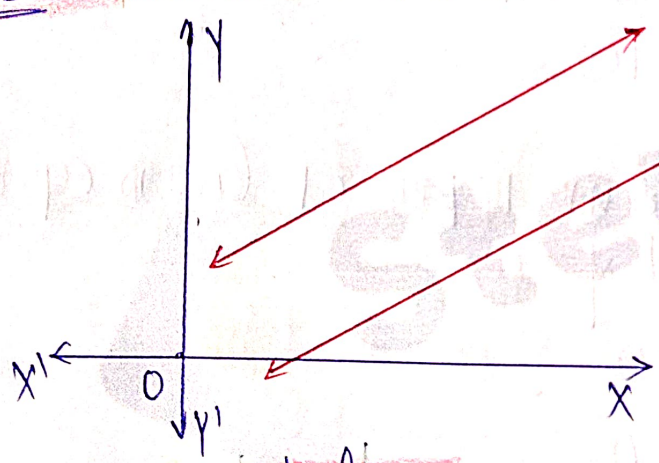
1. Intersect at a point.



$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

Unique solution or Exactly One solution – Consistent solution.

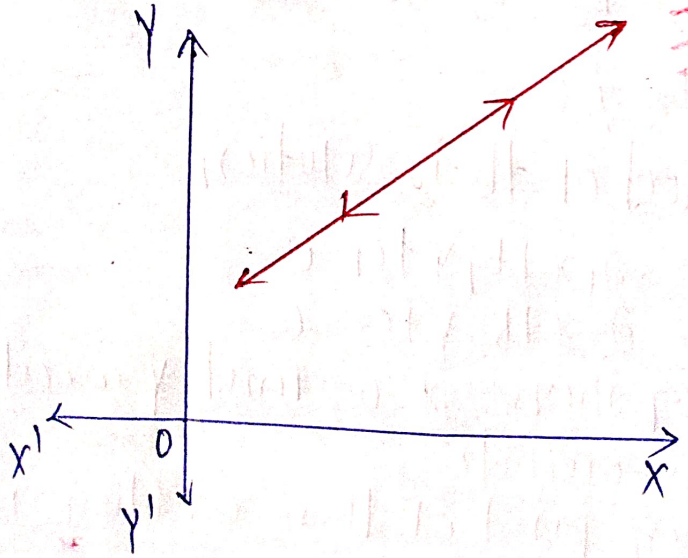
#2. Coincident lines



$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

Infinitely many solution, condition too consistency.

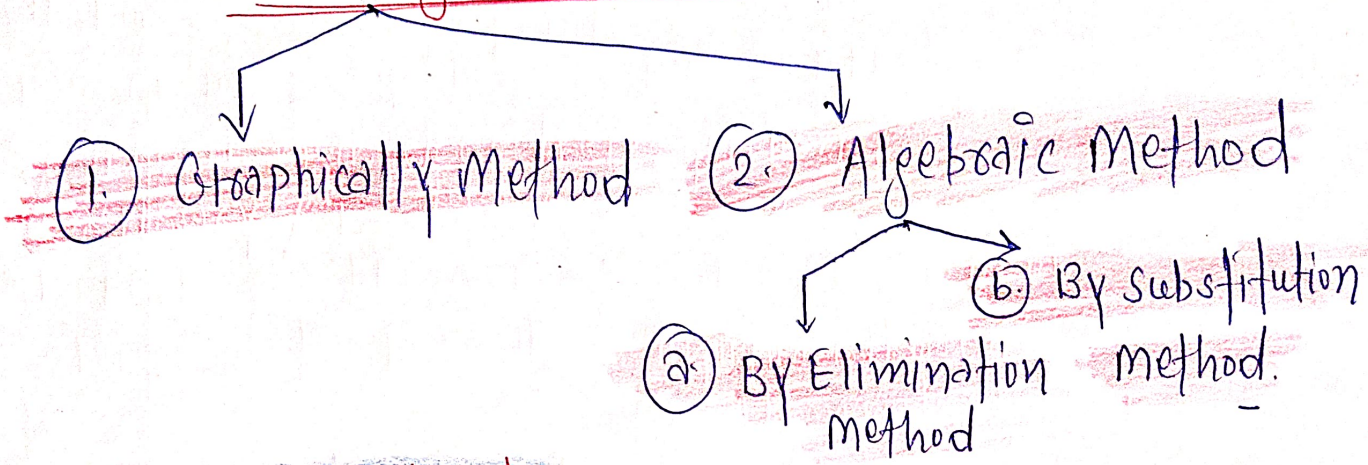
#3. Parallel lines



$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

No solution / Inconsistent solution.

Solving Methods



Algebraic Method

$a_1x + b_1y + c_1 = 0$ (Given) $\times a_2$ — (1)

$a_2x + b_2y + c_2 = 0$ (Given) $\times a_1$ — (2)

Substract equation (1) − equation (2) and find the value of y. Now, put the value of 'y' in any of the given equation and find the value of x.

Substitution method.

$a_1x + b_1y + c_1 = 0$ (Given) — (1)

$a_2x + b_2y + c_2 = 0$ (Given) — (2)

Write any one of the equation in term of y and put the value of x in another equation and find the value of y.

Again, put the value of y in any equation and find x.

— The End —