Lecture 1

No. 1

CHAPTER NO. 3

PAIRS OF LINEAR EQUATION IN TWO VARIABLES

3. Pair of Linear Equations In Two Variables

AN EQUATION WITH

Degree 1

HIGHEST POWER OF VARIABLE

...TICAL STATEMENT WITH ...ARIABLE AND AN '=' SIGN

IS IT AN EQUATION?

$x^1 + 3 = 0$

$y^1 + 3 = 0$

... + 3 = 0

... + 9 = 0

IS IT AN EQUATION?

IS IT AN EQUATION?

$y^1 + 9 = 0$

Standard Form of Linear Equation i... 2 variables...s:-

THERE CO-EFFICIENT

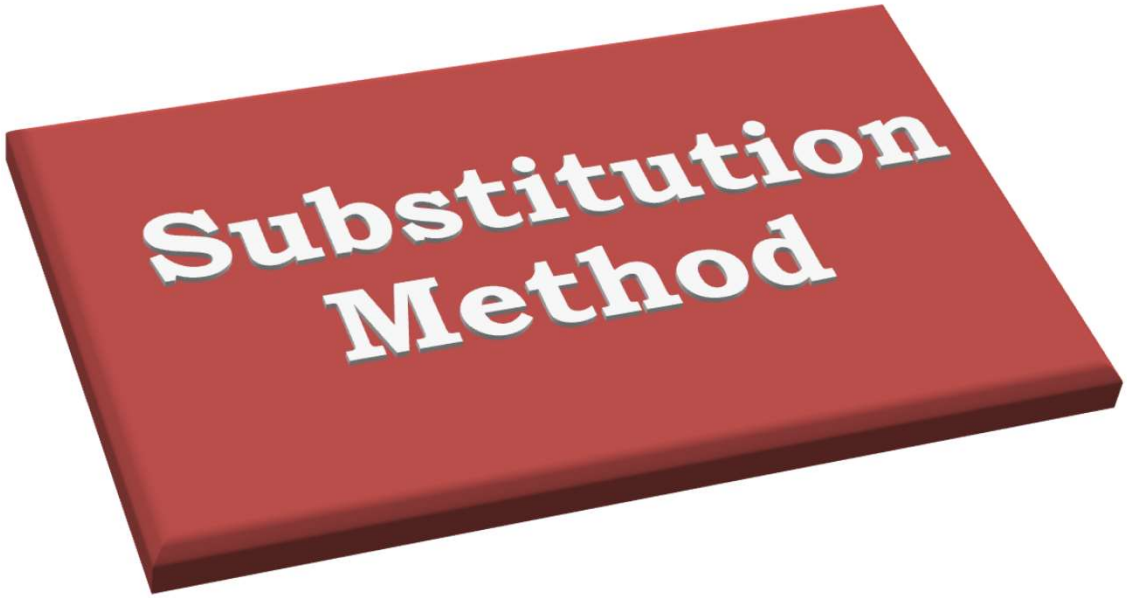
$$ax + by + c = 0$$

Real numbers

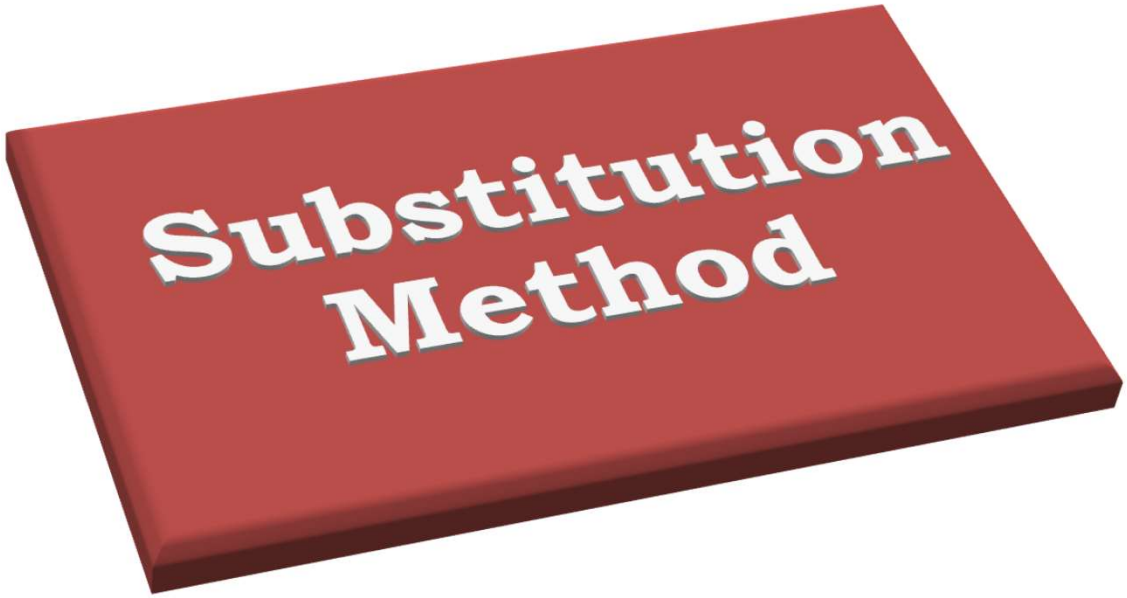
$a \neq 0$ and $b \neq 0$

No. 2

Methods to solve Linear Equations In 2 Variables


Substitution
Method

No. 3


Substitution
Method

Q. Solve the following pair of linear equations by the substitution method.

(i) $x + y = 14 ; x - y = 4$

Soln.

$x + y = 14$ ... (i)

$x - y = 4$ ... (ii)

Consider (ii)

$x - y = 4$

$x = 4 + y$ ... (iii)

Substituting equation (iii) in

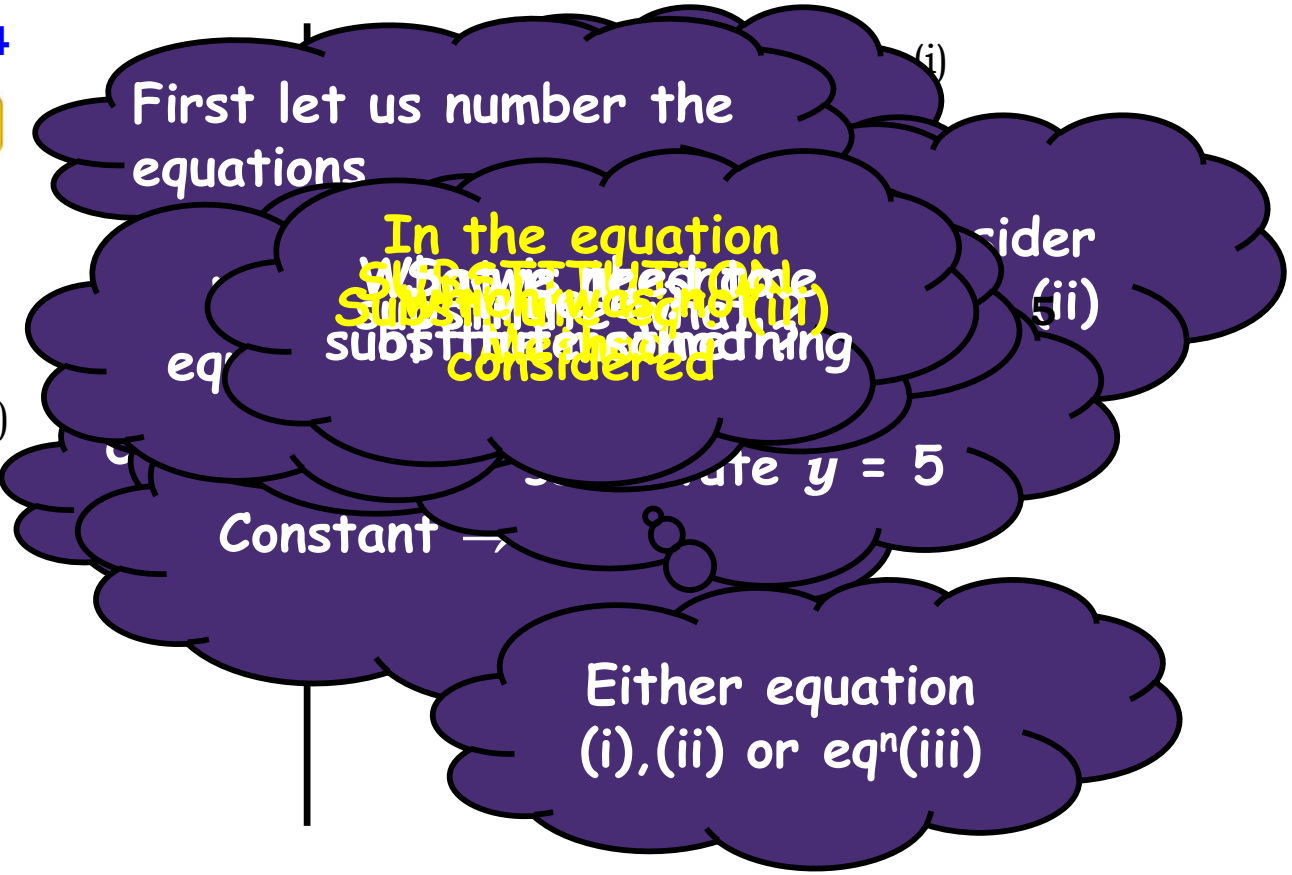
$(4 + y) + y = 14$

$4 + 2y = 14$

$2y = 14 - 4$

$2y = 10$

$\boldsymbol{y = 5}$



No. 4

(ii) $s - t = 3 \; ; \; \frac{s}{3} + \frac{t}{2} = 6$

Soln. $s - t = 3$ … (i)

$$\frac{s}{3} + \frac{t}{2} = 6$$

Multiplying throughout by 6,

$$2 \cancel{6} \left(\frac{s}{\cancel{3}}\right) + 3 \cancel{6} \left(\frac{t}{\cancel{2}}\right) = 6 \times 6$$

$2s + 3t = 36$ … (ii)

Consider (i)

$s - t = 3$

$s = t + 3$ … (iii)

Substituting equation (iii) in eq

$2(t + 3) + 3t = 36$

$2t + 6 + 3t = 36$

$5t + 6 = 36$

$5t = 36 - 6$

$5t = 30$

$t = \frac{30}{5}$ (6)

$t = 6$

Now By Subst... eq... Me...

How to get the value of s ?

Writ... either ... or t...

Remove the denominator

Substitute eqn (ii) ... considered

...ider (i)

two equations

Constan...

...us substitute eqn (iii)

No. 5

(iii) $3x - y = 3$; $9x - 3y = 9$

Soln.

$3x - y = 3$ ... (i)

$9x - 3y = 9$ ... (ii)

Consider (i)

$3x - y = 3$

$x = \left[\dfrac{y + 3}{3}\right]$ ... (iii)

Substituting equation (iii) in equa

$3 \cdot \left[\dfrac{y + 3}{3}\right] - 3y = 9$

$3y + 9 - 3y = 9$

$9 = 9$

Since both the variables get cancelled on solving.

These equations do not have a unique solution

First let us number the equations

Number

ider

(i)

In the equation

Substitute

considered

the two equation

HOMEWORK

(v) $\sqrt{2}x + \sqrt{3}y = 0 \; ; \sqrt{3}x - \sqrt{8}y = 0$

Soln. $\sqrt{2}x + \sqrt{3}y = 0$ …(i)

$\sqrt{3}x - \sqrt{8}y = 0$ …(ii)

Consider (i)

$\sqrt{2}x + \sqrt{3}y = 0$

$\therefore \quad \sqrt{2}x = -\sqrt{3}y$

$\therefore \quad x = \dfrac{-\sqrt{3}y}{\sqrt{2}}$

Substituting $x = \dfrac{-\sqrt{3}y}{\sqrt{2}}$ In eqⁿ(

$\therefore \quad \sqrt{3}\left(\dfrac{-\sqrt{3}y}{\sqrt{2}}\right) - \sqrt{8}y = 0$

$\therefore \quad \dfrac{-3y - 4y}{\sqrt{2}} = 0$

$\therefore \quad -7y = 0 \times \sqrt{2}$

How to get the

Number the equation as (iii)

Let us substitute eqⁿ (iii)

Solution is $x = 0$, $y = 0$

No. 6

(vi) $\frac{3x}{2} - \frac{5y}{3} = -2$; $\frac{x}{3} + \frac{y}{2} = \frac{13}{6}$

Soln. $\frac{3x}{2} - \frac{5y}{3} = -2$

Multiplying throughout by 6 we get

$$3 \cancel{6}\left(\frac{3x}{\cancel{2}}\right) - 2 \cancel{6}\left(\frac{5y}{\cancel{3}}\right) = -2 \times 6$$

$$9x - 10y = -12 \quad \ldots(i)$$

$$\frac{x}{3} + \frac{y}{2} = \frac{13}{6}$$

Multiplying throughout by 6 we get

$$2 \cancel{6}\left(\frac{x}{\cancel{3}}\right) + 3 \cancel{6}\left(\frac{y}{\cancel{2}}\right) = \frac{13}{\cancel{6}} \times \cancel{6}$$

$$2x + 3y = 13 \quad \ldots(ii)$$

Consider (i)

$$9x - 10y = -12$$

$$9x = -12 + 10y$$

$$x = \frac{-12 + 10y}{9} \quad \ldots(iii)$$

Substituting eqⁿ (iii) in eqⁿ (ii)

$\therefore$

$\therefore$ $x = 2$

If any number is in the denominator become than it difficult to solve

First let us number the equation

consider (i)

Substitute y = 3

In the equation (ii) or (iii)

Substituting the value of y in (iii)

$x = 2, y = 3$

No. 7

Q. Solve the following pair of linear equations by the substitution method.

$3x - y = 3$; $9x - 3y = 9$

Soln. $3x - y = 3$ … (i)

$9x - 3y = 9$ … (ii)

Write this equation either $x =$ something

Consider simpler of the two equations

Consider (i)

$3x - y = 3$

$x = \dfrac{y + 3}{3}$ … (iii)

Substituting equation (iii) in equation (ii) ;

$3 \left[\dfrac{y + 3}{3}\right] - 3y = 9$

$3y + 9 - 3y = 9$

$9 = 9$

Since both the variables get cancelled on solving.

These equations do not have a unique solution

No. 8

Q. Solve the following pair of linear equations by the substitution method $0.2x + 0.3y = 1.3$; $0.4x + 0.5y = 2.3$

Lets multiply both equation by 10 to remove decimal point

Soln.

$$2x + 3y = 13 \quad \ldots (i)$$

$$4x + 5y = 23 \quad \ldots (ii)$$

Consider (i)

$$2x + 3y = 13$$

$$x = \frac{13 - 3y}{2} \quad \ldots (iii)$$

Substituting equation (iii) in equation (ii)

$$4\left[\frac{13 - 3y}{2}\right] + 5y = 23$$

$$26 - 6y + 5y = 23$$

$$-1y = 23 - 26$$

$$-1y = -3$$

$$y = \frac{-3}{-1}$$

$$y = 3$$

Substitute y = 3 in

Write this equation

Consider simpler of the two equations

$$x = \frac{13 - 3(3)}{2}$$

$$= \frac{13 - 9}{2}$$

$$= \frac{4}{2}$$

$$x = 2$$

∴ x = 2 and y = 3 is the solution of the given equations.

Thank You