

CHAPTER - 3

ALGEBRA

1) CONCEPTS:

Exercise: 3.1

i) LINEAR EQUATION:

* An equation which has only one degree with 2 or 3 variables.

* It is also known as First degree eqn

* It is known as straight line eqn when equation has only two variables.

EXAMPLES:

General form	With Numerics
$ax + by + d = 0$	$2x - 3y - 6 = 0$
$ax + by + cz + d = 0$	$3x - 2y + z - 2 = 0$

ii) STEPS TO SOLVE LINEAR EQUATION:

Consider equations ①, ②, ③, each with 3 variables, first degree equation.

STEP 1: Consider any two equations from ①, ②, ③ in order to cancel a common term either directly or by multiplying a non-zero constant, which is ④.

STEP 2: Now consider any other two equations from ①, ②, ③ and repeat the same process as step 1 and the resulting eqn is ⑤.

STEP 3: Now equate eqn ④ and ⑤ to cancel the common terms and to fetch the value of either of variables.

STEP 4: Substitute the resulted value in eqn ④ or ⑤ to get the value of other variable.

STEP 5: Substitute both the values in either of eqns ①, ②, ③ to get the values of all three variables.

2) EXAMPLE:

$$\text{Solve, } 3x - 2y + z = 2 \longrightarrow \text{①}$$

$$2x + 3y - z = 5 \longrightarrow \text{②}$$

$$x + y + z = 6 \longrightarrow \text{③}$$

STEP 1: Consider ① and ②.

$$3x - 2y + z = 2$$

$$2x + 3y - z = 5$$

$$5x + y = 7 \longrightarrow \textcircled{4}$$

STEP 2: consider ② and ③.

$$2x + 3y - z = 5$$

$$x + y + z = 6$$

$$3x + 4y = 11 \longrightarrow \textcircled{5}$$

STEP 3: Equating ④ + ⑤

$$\begin{array}{r} 5x + y = 7 \\ 3x + 4y = 11 \end{array} \rightarrow \times \textcircled{4} \Rightarrow \begin{array}{r} 20x + 4y = 28 \\ (-) 3x + 4y = 11 \end{array}$$

$$17x = 17$$

$$\therefore x = 1$$

STEP 4: Substitute $x=1$ in eqn ④,

$$5(1) + y = 7$$

$$y = 7 - 5$$

$$y = 2$$

STEP 5: Substitute $x=1, y=2$ in eqn ①,

$$3(1) - 2(2) + z = 2$$

$$3 - 4 + z = 2$$

$$z = 3$$

Hence, $x = 1, y = 2, z = 3$