CHAPTER

2 LINEAR EQUATIONS IN ONE VARIABLE

- **Equation :** An equation is a statement of equality which contains one or more unknown quantity/quantities (or variable/variables) is called an equation.
- **Linear equation in one variable :** An equation is called linear equation if it has only one degree *i.e.*, the highest power of the variable appearing in equation is 1, and the form of linear equation is

  $P(x) = ax + b = 0$, e.g., $x + 5 = 0$, $\frac{x}{2} - 7 = 15$.

- **Solving an equation :** Solving an equation means determining its root *i.e.*, determining (finding) the value of the variable which satisfies it.
- A linear equation may have any rational number, as its solution.
- An equation may have linear expression on both sides of the equation.
- Some equations may not be linear in the beginning, but they can be brought to be linear by using usual methods.
- The utility of linear equations is in their diverse applications, different problems on numbers, ages, perimeters, combination of currency notes and so on can be solved using linear equations.
- A number which satisfies an equation is called the solution of the equation.
- A term may be transposed from one side of the equation to the other side, but its sign will be changed.

Ex. 1. Solve : $\frac{15}{4} - 7x = 9$

Sol. We have $\frac{15}{4} - 7x = 9$

Transposing $\frac{15}{4}$ to RHS

$$-7x = 9 - \frac{15}{4}$$

$$-7x = \frac{36-15}{4} = \frac{21}{4}$$

$$x = \frac{21}{4\times(-7)}$$

$$x - = \frac{-3}{4}$$

Check $\quad \text{LHS} = \frac{15}{4} - 7 \times \left(\frac{-3}{4}\right).$

$$= \frac{15}{4} + \frac{21}{4} = \frac{36}{4} = 9 = \text{RHS}$$

Ex. 2. Solve : $\frac{6x+1}{3} + 1 = \frac{x-3}{6}$

Sol. Since LCM of 3 and 6 is 6. So multiply both sides by 6, we have

$$\frac{6(6x+1)}{3} + 6 = \frac{6(x-3)}{6}$$

$$2(6x + 1) + 6 = x - 3 \qquad 12x + 2 + 6 = x - 3$$

$$12x - x = -3 - 2 - 6$$

$$11x = -11$$

$$x = -1$$

$$\text{LHS} = \frac{6(-1)+1}{3} + 1 = \frac{-5}{3} = 1 = \frac{-2}{3}$$

$$= \frac{-1-3}{6} = \frac{-4}{6} = \frac{-2}{3}$$

$$\text{LHS} = \text{RHS}$$