Simple Equations

- **Variable:** A symbol which takes various values is known as a variable. Normally it is denoted by letters x, y etc.

- **Constant:** A symbol having a fixed numerical value is called a constant.
  Sometimes, 'c', 'k' etc., are used as symbols to denote a constant.

- **Coefficient:** In the product of a variable and a constant, each is called the coefficient of the other. Sometimes, symbols like a, b, I, m etc., are used to denote the coefficients.

- **Expression:** An expression can be defined as a combination of constants, variables and coefficients by some or all of the four fundamental mathematical operations (+,-, x and -). **e.g.**
  q3y -14 here, 3 is the coefficient of 'y', 'y' is the variable and -14 is the constant.

- **Equation:** A statement of equality of two algebraic expressions involving a variable is called an equation.

- **Simple linear equation:** An equation which contains only one variable of degree 1 is called a simple linear equation.
  e.g.
  (i) $3x - 2 = 5 - 4x$ (ii) $2(t - 4) = 6$
  (iii) $2y + 5 = \frac{Y}{6} - 2$ (iv) $\frac{p-6}{6} + \frac{2p}{7} = 3$

- **Solution of an equation:** The value of the variable, which when substituted in the given equation, makes the two sides LH.S. (Left Hand Side) and R.H.S. (Right Hand Side) of the equation equal is called the solution or root of that equation.
  e.g., $3x + 4=10 \Rightarrow 3x\ 10\text{-}4 = 6 \Rightarrow x = 2$

- **Verification:**
  Substituting $x = 2$, we have
  L.H.S. $= 3x + 4 = 3\ (2) + 4 = 6 + 4 = 10 =$ R.H.S.
  $x = 2$ is a solution of the given equation $3x + 4 = 10$.

Rules for solving an equation:

- Same number can be added to both sides of an equation.
- Same number can be subtracted from both sides of an equation.
- Both sides of an equation can be multiplied by the same non-zero number.
- Both sides of an equation can be divided by the same non-zero number.
- **Transposition:** Any term of an equation may be taken to the other side with the sign changed.

- This process is called transposition.
  e.g., $4x\text{-}5=3x+5 \Rightarrow 4x = 3x+5+5$
  $\Rightarrow 4x - 3x = 10$ [Transposing '-5' to R.H.S]
  $\Rightarrow x=10$ [Transposing '3x' to LH.S.]

- **Cross multiplication:** If $\frac{ax+b}{cx+d}\frac{p}{q}=$ then q(ax + b) = p(cx + d).This process is called cross multiplication.