Linear Equations in One Variable

- **Solving an equation by transposing the terms:**

  If a number is transposed from one side of an equation to the other, then its sign is changed.

  Example: solve $5(x - 7) = -25$

  Solution:

  $5(x - 7) = -25$

  Transposing 5 to R.H.S.

  $$\Rightarrow x - 7 = \frac{-25}{5}$$

  $$\Rightarrow x - 7 = -5$$

  Transposing 7 to R.H.S.

  $\Rightarrow x = -5 + 7$

  $\Rightarrow x = 2$

- There are certain equations which can be reduced to linear equations.

  Example:
  Reduce the given equation to linear equation: $\frac{2-4x}{3x-2} = \frac{3}{2}$

  Solution:
  By cross multiplication, we obtain

  $$\frac{2-4x}{3x-2} \times \frac{3}{2}$$

  $$\Rightarrow (2-4x)2 = 3(3x-2)$$

  $$\Rightarrow 4 - 8x = 9x - 6$$

  This is a linear equation in one variable which can be solved easily.

  Linear equations in one variable can be used to solve many problems.

Example:
Meesha's age is 8 years more than twice her daughter's age.
Four years ago, Meesha's age was $\frac{7}{2}$ times her daughter's age. What is her daughter's present age?

Solution:
Let Meesha's daughter's age be x years.
$\therefore$ Meesha's age = $(2x + 8)$ years

Four years ago, her daughter's age = $(x - 4)$ years
Four years ago, Meesha's age = $(2x + 8 - 4)$ years = $(2x + 4)$ years

According to the given information,

$$(2x + 4) = \frac{7}{2}(x - 4)$$

$$\Rightarrow 2 \times (2x + 4) = 7(x - 4)$$

$$\Rightarrow 4x + 8 = 7x - 28$$

$$\Rightarrow 4x - 7x = -28 - 8$$

$$\Rightarrow -3x = -36$$

$$\Rightarrow x = 12$$

Thus, Meesha's daughter's age is 12 years.

- An algebraic equation is an equality involving variables. In an equation, the value of expression on the left hand side (LHS) is equal to the value of expression on the right hand side (RHS).