Application of Equations

In real life, the applications of linear equations are vast. To tackle real-life problems using algebra, we convert the given situation into mathematical statements in such a way that it clearly illustrates the relationship between the unknowns (variables) and the information provided.

We have to follow the following steps while restating a situation into a mathematical statement:

Step 1: Translate the problem statement into a mathematical statement and set it up in the form of algebraic expression.

Step 2: Identify the unknowns in the problem and assign variables to these unknown quantities.

Step 3: Frame an equation with the help of the algebraic expression and the data provided in the problem statement and solve it using systematic techniques of equation solving.

Step 4: Retrace your solution to the problem statement and analyze if it suits the criterion of the problem.

Applications of Linear equations in Real life

- Finding unknown age
- Finding unknown angles in geometry
- For calculation of speed, distance or time
- Problems based on force and pressure

Let us understand with an example

Example: Rishi is twice as old as Vani. 10 years ago his age was thrice of Vani. Find their present ages.

Solution: In this word problem, the ages of Rishi and Vani are unknown quantities. Therefore, as discussed above, let us first choose variables for the unknowns.

Let us assume that Vani's present age is 'x' years.

Since Rishi's present age is 2 times that of Vani, therefore his present age can be assumed to be '2x'.

10 years ago, Vani's age would have been 'x – 10 ', and Rishi's age would have been '2x – 10'.

According to the problem statement, 10 years ago, Rishi's age was thrice of Vani, i.e. $2x - 10 = 3(x - 10)$

We have our linear equation in the variable 'x' which clearly defines the problem statement. Now we can solve this linear equation easily and get the result.

$$2x - 10 = 3(x - 10)$$
$$\Rightarrow 2x - 10 = 3x - 30$$
$$\Rightarrow x = 20$$

This implies that the current age of Vani is 20 years, and Rishi's age is '2x,' i.e. 40 years. Let us retrace our solution. If the present age of Vani is 20 years then 10 years ago her age would have been 10 years, and Rishi's age would have been 30 years which satisfy our problem statement. Thus, applications of linear equations enable us to tackle such real-world problems.