LITTERA PUBLIC SCHOOL

CLASS VI CHAPTER 9 MATHS

The **linear equations in one variable** is an equation which is expressed in the form of ax+b = 0, where a and b are two integers, and x is a variable and has only one solution. For example, 2x+3=8 is a linear equation having a single variable in it. Therefore, this equation has only one solution, which is x = 5/2. Whereas if we speak about linear equation in two variables, it has two solutions.

The concept of linear equation in one variable has been covered in this lesson, including its definition, solutions, examples, word problems and worksheet questions. This is an important topic for Class 6, 7 and 8 students. The concepts covered in this lesson are mentioned below in the table of contents. So, what is one variable equation?

Table of Content:

Linear Equation in One Variable Definition

A linear equation in one variable is an equation which has a maximum of one variable of order 1. It is of the form **ax + b = 0**, where x is the variable.

This equation has only one solution. A few examples are:

- 3x = 1
- 22x-1=0
- 4x+9=-11

Standard Form of Linear Equations in One Variable

The standard form of linear equations in one variable is represented as:

ax + b = 0

Where,

- ‘a’ and ‘b’ are real numbers.
- Both ‘a’ and ‘b’ are not equal to zero.

Thus, the **formula of linear equation in one variable is ax + b = 0.**

Solving Linear Equations in One Variable

For solving an equation having only one variable, the following steps are followed

- **Step 1**: Using LCM, clear the fractions if any.
- **Step 2:** Simplify both sides of the equation.
- **Step 3:** Isolate the variable.
- **Step 4:** Verify your answer.

Example of Solution of Linear Equation in One Variable

Let us understand the concept with the help of an example.

For solving equations with variables on both sides, the following steps are followed:

Consider the equation: **5x – 9 = -3x + 19**

Step 1: Transpose all the variables on one side of the equation. By transpose, we mean to shift the variables from one side of the equation to the other side of the equation. In the method of transposition, the operation on the operand gets reversed.

In the equation 5x – 9 = -3x + 19, we transpose -3x from the right-hand side to the left-hand side of the equality, the operation gets reversed upon transposition and the equation becomes:

5x – 9 +3x = 19

⇒ 8x -9 = 19

Step 2: Similarly transpose all the constant terms on the other side of the equation as below:

8x -9 = 19

⇒ 8x = 19 + 9

⇒ 8x = 28

Step 3: Divide the equation with 8 on both sides of the equality.

8x/8 = 28/8

⇒ x = 28/8

If we substitute x = 28/8 in the equation 5x – 9 = -3x + 19, we will get 9 = 9, thereby satisfying the equality and giving us the required solution.

Linear Equation in One Variable Examples

Example 1 : Solve for x, 2x – 4 = 0

Solution:

Add 4 both sides

2x – 4 + 4 = 0 + 4

2x = 4

Divide each side by 2, we get

2x/2 = 4/2

x = 4/2 = 2

So, x = 2 is the answer.

Example 2: Solve 12m – 10 = 6

Solution:

12m – 10 = 6

Add 10 both sides

12m – 10 + 10 = 6 + 10

12m = 16

Divide each side by 12, we get

12m/12 = 16/12

m = 16/12 = 4/3

Answer: m = 4/3

Linear Equations in One Variable Word Problems

Problem: The length of the legs of an isosceles triangle is 4 meters more than its base. If the Perimeter of the triangle is 44 meters, find the lengths of the sides of the triangle.

Solution:

Let us assume the base measures ‘x’ meter. Hence, each of the legs measure y = (x + 4) meters.

The Perimeter of a triangle is the sum of the three sides.

The equations are formed and solved as follows:

x + 2(x + 4) = 44

x + 2x + 8 = 44

3x + 8 = 44

3x = 44 – 8 = 36

3x = 36

x = 36/3

x = 12

The length of the base is solved as 12 meters. Hence, each of the two legs measure 16 meters.

Linear Equations in One Variable Word Questions (Worksheet)

A few practice questions are given below.

- **Question 1:** Solve (10x – 7) = 21
- **Question 2:** Find the multiples, if the sum of two consecutive multiples of 6 is 68.
- **Question 3:** Verify that if x = -3, is a solution of the linear equation 10x + 7 = 13 – 5x.

Frequently Asked Questions

How many solutions does a linear equation in one variable have?

Every linear equation in one variable has a one and unique solution. If the equation has two or more variables then it becomes a linear equation in two variables or linear equations in three variables and so on and the number of solutions varies as per the count of variables an equation contains.

What is the formula of linear equation in one variable?

The formula or the standard form of an equation having only 1 variable is given as ax + b = 0. In this, there is only 1 variable, i.e. x.