# Linear Equations in One Variable

### **Understanding of Linear Equations in One Variable**

- A linear equation in one variable is an equation that has only one variable and the highest power of the variable is 1.
- It represents a straight line when graphed on a number line.
- Solving a linear equation means finding the value of the variable that makes the equation true.

# **Important Points**

- General form: ax + b = 0 where a and b are real numbers and  $a \neq 0$ .
- Perform the same operation on both sides to maintain equality.
- Operations used include addition, subtraction, multiplication, and division.
- Always simplify expressions before solving.
- Check the solution by substituting it back into the original equation.

# **Examples with Solutions**

#### **Example: Simple Equation**

- ➢ Solve: x + 5 = 12.
- **Solution:** x = 12 5 = 7

#### **Example: Equation with Negative Number**

Solve: x − 8 = −2.
Solution: x = −2 + 8 = 6

# **Example: Equation with Coefficient Other Than 1**

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Solve: 3x = 15.
Solution: x = 15 ÷ 3 = 5
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# **Example: Equation with Variables on Both Sides**

➢ Solve: 2x + 3 = x + 7.

**Solution:** 2x - x = 7 - 3

**Example: Equation Involving Fractions** 

Solve: 
$$\frac{x}{2} + 3 = 7$$
.  
Solution:  $\frac{x}{2} = 7 - 3$   
 $\frac{x}{2} = 4$ 

$$x = 4 \times 2 = 8$$

# **Summary Points**

- Linear equation in one variable has degree 1.
- Keep the variable on one side and constants on the other side.
- Perform inverse operations to isolate the variable.
- Simplify fractions and combine like terms when necessary.
- Always verify the solution by substitution.