

10. Equations

- The value of variable which satisfies the equation is known as the **solution** of the equation.
- For example, consider the equation $2x - 5 = 7$
- When $x = 6$, $\text{LHS} = 2 \times 6 - 5 = 12 - 5 = 7 = \text{RHS}$.
- $\therefore x = 6$ is the solution of the equation, $2x - 5 = 7$.
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- The solution of an equation is calculated by a method known as **trial and error method**. In this method, some value of the variable is substituted and it is checked whether it satisfies the equation. Different values of variables are substituted until the right value is found, which satisfies the equation.

For example, for the equation $7x - 2 = 19$

Put $x = 1$,

$$\therefore \text{LHS} = 7 \times 1 - 2 = 7 - 2 = 5 \neq 19$$

$$\Rightarrow \text{LHS} \neq \text{RHS}$$

Therefore, $x = 1$ is not the solution.

Put $x = 2$,

$$\text{LHS} = 7 \times 2 - 2 = 14 - 2 = 12 \neq 19$$

$$\therefore \text{LHS} \neq \text{RHS}$$

Therefore, $x = 2$ is not the solution.

Put $x = 3$,

$$\text{LHS} = 7 \times 3 - 2 = 21 - 2 = 19 = \text{RHS}$$

Therefore, $x = 3$ is the solution of the equation, $7x - 2 = 19$

- **Solving an equation by performing same mathematical operation on both sides:**

It is known that an equation remains unchanged on adding or subtracting the same number on both sides. Therefore, using this property, an equation can be solved.

Consider $3x - 7 = 2$

Adding 7 on both sides, we obtain

$$3x - 7 + 7 = 2 + 7$$

$$\Rightarrow 3x = 9$$

Dividing both sides by 3, we obtain

$$\frac{3x}{3} = \frac{9}{3}$$

$$\Rightarrow x = 3$$

Therefore, $x = 3$ is the solution of $3x - 7 = 2$