TEXT BOOK EXERCISE 2.1

Q. Solve the following equations and verify the result :

(1) $2x - 3 = x + 2$

(2) $5x - 6 = 2x + 9$

(3) $5a - 3 = 3a - 5$

(4) $5x + 9 = 5 + 3x$

(5) $4y + 3 = 6 + 2y$

(6) $3x - 1 = 15 - x$

(7) $4x + 3 = 2(x - 1) + 5$

(8) $3l - 5 = 4(l + 2) - 6$

(9) $6x = 5(x + 10) - 2.$

Solution. (1) We have : $2x - 3 = x + 2$

Transposing -3 to R.H.S. and x to L.H.S., we get :

$$2x - x = 2 + 3 \Rightarrow x = 5 \text{ Ans.}$$

Verification : Put $x = 5$ in the given equation, we get :

$$\text{L.H.S.} = 2x - 3 \qquad \bigg| \qquad \text{R.H.S.} = x + 2$$
$$= 2(5) - 3 \qquad \bigg| \qquad = 5 + 2$$
$$= 10 - 3 = 7 \qquad \bigg| \qquad = 7$$

$\therefore$ L.H.S. = R.H.S.

Both sides are equal

Hence, the solution is verified.

(2) We have, $5x - 6 = 2x + 9$

Transposing -6 to R.H.S. and $2x$ to L.H.S. we get :

$$5x - 2x = 9 + 6 \Rightarrow 3x = 15$$

$$\Rightarrow \qquad x = \frac{15}{3} = 5 \text{ Ans.}$$

Verification : Put $x = 5$ in the given equation.

$$\text{L.H.S.} = 5x - 6 \qquad \bigg| \qquad \text{L.H.S.} = 2x + 9$$
$$= 5(5) - 6 \qquad \bigg| \qquad = 2(5) + 9$$
$$= 25 - 6 \qquad \bigg| \qquad = 10 + 9$$
$$= 19 \qquad \bigg| \qquad = 19$$

$\therefore$ L.H.S. = R.H.S.

Both sides are equal.

Hence, the solution is verified.

(3) We have : $5a - 3 = 3a - 5$

Transposing -3 to R.H.S and $3a$ to L.H.S. we get

$$5a - 3a = -5 + 3$$
$$\Rightarrow \qquad 2a = -2$$

$$\Rightarrow \qquad a = \frac{-2}{2} = -1 \text{ Ans.}$$

Verification : Put $a = -1$ in the given equation, we get

$$\text{L.H.S.} = 5a - 3 \qquad \bigg| \qquad \text{R.H.S.} = 3a - 5$$
$$= 5(-1) - 3 \qquad \bigg| \qquad = 3(-1) - 5$$
$$= -5 - 3 \qquad \bigg| \qquad = -3 - 5$$
$$= -8 \qquad \bigg| \qquad = -8$$

$\therefore$ L.H.S. = R.H.S.

Both sides are equal

Hence, the solution is verified.

(4) We have : $5x + 9 = 5 + 3x$

Transposing 9 to R.H.S. and 5 to L.H.S., we get

$$5x - 3x = 5 - 9$$
$$\Rightarrow \qquad 2x = -4$$

$$\Rightarrow \qquad x = \frac{-4}{2} = -2 \text{ Ans.}$$

Verification : Put $x = -2$ in the given equation, we get

$$\text{L.H.S.} = 5x + 9 \qquad \bigg| \qquad \text{R.H.S.} = 5 + 3x$$
$$= 5(-2) + 9 \qquad \bigg| \qquad = 5 + 3(-2)$$
$$= -10 + 9 \qquad \bigg| \qquad = 5 - 6$$
$$= -1 \qquad \bigg| \qquad = -1$$

$\therefore$ L.H.S. = R.H.S.

Hence, the solution is verified.

(5) We have : $4y + 3 = 6 + 2y$

Transposing 3 to R.H.S. and $2y$ to L.H.S. we get :

$$4y - 2y = 6 - 3$$
$$\Rightarrow \qquad 2y = 3$$

$$\Rightarrow \qquad y = \frac{3}{2} \text{ Ans.}$$

Verification : Put $y = \frac{3}{2}$, in the given equation, we get :

$$\text{L.H.S.} = 4y + 3 \qquad \bigg| \qquad \text{R.H.S.} = 6 + 2y$$
$$= 4\left(\frac{3}{2}\right) + 3 \qquad \bigg| \qquad = 6 + 2\left(\frac{3}{2}\right)$$
$$= 6 + 3 = 9 \qquad \bigg| \qquad = 6 + 3 = 9$$

$\therefore$ L.H.S. = R.H.S.

Hence, the solution is verified.

(6) We have : $3x - 1 = 15 - x$

Transposing -1 to R.H.S. and $-x$ to L.H.S. we get :

$$3x + x = 15 + 1$$
$$\Rightarrow \qquad 4x = 16$$

$$\Rightarrow \qquad x = \frac{16}{4} = 4 \text{ Ans.}$$

Verification : Put $x = 4$ in the given equation, we get :

$$\text{L.H.S.} = 3x - 1 \qquad \bigg| \qquad \text{R.H.S.} = 15 - x$$
$$= 3(4) - 1 \qquad \bigg| \qquad = 15 - 4$$
$$= 12 - 1 = 11 \qquad \bigg| \qquad = 11$$

$\therefore$ L.H.S. = R.H.S.

Hence, the solution is verified.

(7) We have : $4x + 3 = 2(x - 1) + 5$
$$\Rightarrow 4x + 3 = 2x - 2 + 5$$
$$\Rightarrow 4x + 3 = 2x + 3$$

Transposing 3 to R.H.S. and $2x$ to L.H.S. to get :

$$4x - 2x = 3 - 3$$

$$\Rightarrow \quad 2x = 0 \Rightarrow x = \frac{0}{2} = 0 \text{ Ans.}$$

Verification : Put $x = 0$, in the given equation, we get :

L.H.S. $= 4x + 3$	R.H.S. $= 2(x - 1) + 5$
$= 4(0) + 3$	$= 2(0 - 1) + 5$
$= 0 + 3$	$= -2 + 5$
$= 3$	$= 3$

$\therefore$ L.H.S. = R.H.S.

Hence, the solution is verified.

(8) We have : $3l - 5 = 4(l + 2) - 6$

$\Rightarrow 3l - 5 = 4l + 8 - 6$

$\Rightarrow 3l - 5 = 4l + 2$

Transposing -5 to R.H.S. and $4l$ to L.H.S. we get :

$$3l - 4l = 2 + 5$$

$$\Rightarrow \quad -l = 7 \Rightarrow l = -7 \text{ Ans.}$$

Verification : Put $l = -7$ in the given equation, we get :

L.H.S. $= 3l - 5$	R.H.S. $= 4(l + 2) - 6$
$= 3(-7) - 5$	$= 4(-7 + 2) - 6$
$= -21 - 5$	$= 4(-5) - 6$
$= -26$	$= -20 - 6 = -26$

$\therefore$ L.H.S. = R.H.S.

Hence, the solution is verified.

(9) We have : $6x = 5(x + 10) - 2$

$\Rightarrow \quad 6x = 5x + 50 - 2$

$\Rightarrow \quad 6x = 5x + 48$

Transposing 5 to R.H.S. we get

$$6x - 5x = 48$$

$$\Rightarrow \quad x = 48 \text{ Ans.}$$

Verification : Put $x = 48$ in the given equation, we get :

L.H.S. $= 6x$	R.H.S. $= 5(x + 10) - 2$
$= 6(48)$	$= 5(48 + 10) - 2$
$= 288$	$= 5(58) - 2$
	$= 290 - 2 = 288$

$\therefore$ L.H.S. = R.H.S.

Hence, solution is verified.

TEXT BOOK EXERCISE 2.2