



Exercise 7A

$$\begin{aligned}\text{LHS: } \frac{1}{2}x - 3 \\ &= \frac{1}{2^1} \times \cancel{4} \cdot 8^{24} - 3 \\ &= 24 - 3 \\ &= 21\end{aligned}$$

$$\begin{aligned}\text{RHS: } 5 + \frac{1}{3}x \\ &= 5 + \frac{1}{3^1} \times \cancel{4} \cdot 8^{16} \\ &= 5 + 16 \\ &= 21\end{aligned}$$

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

Hence, $x=48$ is a solution of the given equation.

Q9

Answer :

$$\begin{aligned}\frac{x}{2} + \frac{x}{4} &= \frac{1}{8} \\ \Rightarrow \frac{x \times 2 + x \times 1}{4} &= \frac{1}{8} \\ \Rightarrow \frac{2x + x}{4} &= \frac{1}{8} \\ \Rightarrow \frac{3x}{4} &= \frac{1}{8} \\ \Rightarrow 3x &= \frac{1}{8^2} \times \cancel{4}^1 \\ \Rightarrow 3x &= \frac{1}{2} \\ \Rightarrow x &= \frac{1}{6}\end{aligned}$$

CHECK: Substituting $x = \frac{1}{6}$ in the given equation, we get:

$$\begin{aligned}
 \text{LHS: } & \frac{x}{2} + \frac{x}{4} \\
 &= \frac{x \times 2 + x \times 1}{4} \\
 &= \frac{2x + x}{4} \\
 &= \frac{3x}{4} \\
 &= \frac{-3}{4} \times \frac{1}{-3} \\
 &= \frac{1}{8}
 \end{aligned}$$

$$\text{RHS: } \frac{1}{8}$$

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

Hence, $x = \frac{1}{3}$ is a solution of the given equation.

Q10

Answer :

We have:

$$\begin{aligned}
 3x + 2(x + 2) &= 20 - (2x - 5) \\
 \Rightarrow 3x + 2x + 4 &= 20 - 2x + 5 \\
 \Rightarrow 3x + 2x + 2x &= 20 + 5 - 4 \quad (\text{Transposing } -2x \text{ to LHS and } 4 \text{ to RHS}) \\
 \Rightarrow 7x &= 21 \\
 \Rightarrow x &= \frac{-21}{-7} \\
 \Rightarrow x &= 3
 \end{aligned}$$

CHECK: Substituting $x=3$ in the given equation, we get:

$$\begin{aligned}
 \text{LHS} &= 3x + 2(x + 2) \\
 &= 3x + 2x + 4 \\
 &= 5x + 4 \\
 &= 5 \times 3 + 4 \\
 &= 15 + 4 \\
 &= 19
 \end{aligned}$$

$$\begin{aligned}
 \text{RHS} &= 20 - (2x - 5) \\
 &= 20 - 2x + 5 \\
 &= 25 - 2 \times 3 \\
 &= 25 - 6 \\
 &= 19
 \end{aligned}$$

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

Hence, $x=3$ is a solution of the given equation.

Q11

Answer :

We have:

$$\begin{aligned}
 13(y - 4) - 3(y - 9) - 5(y + 4) &= 0 \\
 \Rightarrow 13y - 52 - 3y + 27 - 5y - 20 &= 0 \\
 \Rightarrow 13y - 3y - 5y &= 52 + 20 - 27 \quad (\text{Transposing } -52, -20 \text{ and } 27 \text{ to RHS}) \\
 \Rightarrow 5y &= 45 \\
 \Rightarrow y &= \frac{-45}{-5} \\
 \Rightarrow y &= 9
 \end{aligned}$$

CHECK: Substituting $x=9$ in the given equation, we get:

$$\begin{aligned}
 \text{LHS} &= 13(y - 4) - 3(y - 9) - 5(y + 4) \\
 &= 13y - 52 - 3y + 27 - 5y - 20 \\
 &= 13y - 3y - 5y - 52 + 27 - 20 \\
 &= 5y - 45 \\
 &= 5 \times 9 - 45 \\
 &= 45 - 45 \\
 &= 0
 \end{aligned}$$

$$\text{RHS} = 0$$

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

Hence, $x=9$ is a solution of the given equation.

Q12

Answer :

We have,

$$\frac{2m+5}{3} = 3m - 10$$

$$\Rightarrow 2m + 5 = 3(3m - 10)$$

$$\Rightarrow 2m + 5 = 9m - 30$$

$$\Rightarrow 2m - 9m = -30 - 5 \quad (\text{Transposing } 9m \text{ to LHS and } 5 \text{ to RHS})$$

$$\Rightarrow -7m = -35$$

$$\Rightarrow m = \frac{-35}{-7}$$

$$\Rightarrow m = 5$$

CHECK: Substituting $m = 5$ in the given equation, we get:

$$\begin{aligned} \text{LHS} &= \frac{2m+5}{3} \\ &= \frac{2 \times 5 + 5}{3} \\ &= \frac{10+5}{3} \\ &= \frac{15}{3} \\ &= 5 \end{aligned}$$

$$\begin{aligned} \text{RHS} &= 3m - 10 \\ &= 3 \times 5 - 10 \\ &= 15 - 10 \\ &= 5 \end{aligned}$$

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

Hence, $x=5$ is a solution of the given equation.

Q13

Answer :

We have:

$$\begin{aligned}6(3x+2) - 5(6x-1) &= 3(x-8) - 5(7x-6) + 9x \\ \Rightarrow 18x+12 - 30x+5 &= 3x-24 - 35x+30 + 9x \\ &\Rightarrow 18x - 30x - 3x + 35x - 9x = -24 + 30 - 12 \\ -5 \quad & \text{(Transposing } 3x, 9x \text{ and } -35x \text{ to LHS and 12 and 5 to RHS)} \\ \Rightarrow 53x - 42x &= 30 - 41 \\ \Rightarrow 11x &= -11 \\ \Rightarrow x &= \frac{-11}{11} \\ \Rightarrow x &= -1\end{aligned}$$

CHECK: Substituting $x = -1$ in the given equation, we get:

$$\begin{aligned}\text{LHS} &= 6(3x+2) - 5(6x-1) \\ &= 18x+12 - 30x+5 \\ &= -12x+17 \\ &= -12 \times (-1) + 17 \\ &= 12+17 \\ &= 29 \\ \text{RHS} &= 3(x-8) - 5(7x-6) + 9x \\ &= 3x-24 - 35x+30 + 9x \\ &= 12x-35x-24+30 \\ &= -23x+6 \\ &= -23 \times (-1) + 6 \\ &= 23+6 \\ &= 29\end{aligned}$$

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

Hence, $x = -1$ is a solution of the given equation.

Q14

Answer :

We have:

$$\begin{aligned}t - (2t + 5) - 5(1 - 2t) &= 2(3 + 4t) - 3(t - 4) \\ \Rightarrow t - 2t - 5 - 5 + 10t &= 6 + 8t - 3t + 12 \\ \Rightarrow t - 2t + 10t - 8t + 3t &= 6 + 12 + 5 + 5 \quad (\text{By transposition}) \\ \Rightarrow 14t - 10t &= 28 \\ \Rightarrow 4t &= 28 \\ \Rightarrow x &= \frac{28}{4} \\ \Rightarrow x &= 7\end{aligned}$$

CHECK: Substituting $x=7$ in the given equation, we get:

$$\begin{aligned}\text{LHS} &= t - (2t + 5) - 5(1 - 2t) \\ &= t - 2t - 5 - 5 + 10t \\ &= 11t - 2t - 10 \\ &= 9t - 10 \\ &= 9 \times 7 - 10 \\ &= 63 - 10 \\ &= 53\end{aligned}$$

$$\begin{aligned}\text{RHS} &= 2(3 + 4t) - 3(t - 4) \\ &= 6 + 8t - 3t + 12 \\ &= 5t + 18 \\ &= 5 \times 7 + 18 \\ &= 35 + 18 \\ &= 53\end{aligned}$$

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

Hence, $x=7$ is a solution of the given equation.

Q15

Answer :

We have:

$$\frac{2}{3}x = \frac{3}{8}x + \frac{7}{12}$$

$$\Rightarrow \frac{2}{3}x - \frac{3}{8}x = \frac{7}{12} \quad \left(\text{Transposing } \frac{3}{8}x \text{ to LHS} \right)$$

$$\Rightarrow \left(\frac{2 \times 8 - 3 \times 3}{24} \right) x = \frac{7}{12}$$

$$\Rightarrow \left(\frac{16-9}{24} \right) x = \frac{7}{12}$$

$$\Rightarrow \frac{7}{24}x = \frac{7}{12}$$

$$\Rightarrow x = \frac{7^1}{+2^1} \times \frac{2^1}{7^1}$$

$$\Rightarrow x = 2$$

CHECK: Substituting $x=2$ in the given equation, we get:

$$\text{LHS} = \frac{2}{3}x$$

$$= \frac{2}{3} \times 2$$

$$= \frac{4}{3}$$

$$\text{RHS} = \frac{3}{8}x + \frac{7}{12}$$

$$= \frac{3}{8} \times 2 + \frac{7}{12}$$

$$= \frac{6}{8} + \frac{7}{12}$$

$$= \frac{6 \times 3 + 7 \times 2}{24}$$

$$= \frac{18+14}{24}$$

***** END *****