

CBSE Class –VIII Mathematics

NCERT Solutions

CHAPTER - 2

Linear Equations in One Variable (Ex. 2.5)

Solve the following linear equations.

1. $\frac{x}{2} - \frac{1}{5} = \frac{x}{3} + \frac{1}{4}$

Ans. $\frac{x}{2} - \frac{1}{5} = \frac{x}{3} + \frac{1}{4}$

$$\Rightarrow \frac{x}{2} - \frac{x}{3} = \frac{1}{4} + \frac{1}{5}$$

$$\Rightarrow \frac{3x - 2x}{6} = \frac{5 + 4}{20}$$

$$\Rightarrow \frac{x}{6} = \frac{9}{20}$$

$$\Rightarrow x = \frac{9 \times 6}{20} = \frac{27}{10}$$

To check:

$$\frac{x}{2} - \frac{1}{5} = \frac{x}{3} + \frac{1}{4}$$

$$\Rightarrow \frac{27}{10 \times 2} - \frac{1}{5} = \frac{27}{10 \times 3} + \frac{1}{4}$$

$$\Rightarrow \frac{27}{20} - \frac{1}{5} = \frac{9}{10} + \frac{1}{4}$$

$$\Rightarrow \frac{27 - 4}{20} = \frac{18 + 5}{20}$$

$$\Rightarrow \frac{23}{20} = \frac{23}{20}$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

$$2. \frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$$

$$\text{Ans. } \frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$$

$$\Rightarrow \frac{6n - 9n + 10n}{12} = 21$$

$$\Rightarrow \frac{7n}{12} = 21$$

$$\Rightarrow n = \frac{21 \times 12}{7}$$

$$\Rightarrow n = 36$$

To check:

$$\frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$$

$$\Rightarrow \frac{36}{2} - \frac{3 \times 36}{4} + \frac{5 \times 36}{6} = 21$$

$$\Rightarrow 18 - 27 + 30 = 21$$

$$\Rightarrow 21 = 21$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

$$3. x + 7 - \frac{8x}{3} = \frac{17}{6} - \frac{5x}{2}$$

$$\text{Ans. } x + 7 - \frac{8x}{3} = \frac{17}{6} - \frac{5x}{2}$$

$$\Rightarrow \frac{x}{1} - \frac{8x}{3} + \frac{5x}{2} = \frac{17}{6} - \frac{7}{1}$$

$$\Rightarrow \frac{6x - 16x + 15x}{6} = \frac{17 - 42}{6}$$

$$\Rightarrow \frac{5x}{6} = \frac{-25}{6}$$

$$\Rightarrow x = \frac{-25 \times 6}{6 \times 5}$$

$$\Rightarrow x = -5$$

To check:

$$x + 7 - \frac{8x}{3} = \frac{17}{6} - \frac{5x}{2}$$

$$\Rightarrow -5 + 7 - \frac{8 \times (-5)}{3} = \frac{17}{6} - \frac{5 \times (-5)}{2}$$

$$\Rightarrow 2 + \frac{40}{3} = \frac{17}{6} + \frac{25}{2}$$

$$\Rightarrow \frac{6 + 40}{3} = \frac{17 + 75}{6}$$

$$\Rightarrow \frac{46}{3} = \frac{92}{6}$$

$$\Rightarrow \frac{46}{3} = \frac{46}{3}$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

$$4. \frac{x-5}{3} = \frac{x-3}{5}$$

$$\text{Ans. } \frac{x-5}{3} = \frac{x-3}{5}$$

$$\Rightarrow 5 \times (x-5) = 3(x-3)$$

$$\Rightarrow 5x - 25 = 3x - 9$$

$$\Rightarrow 5x - 3x = -9 + 25$$

$$\Rightarrow 2x = 16$$

$$\Rightarrow x = \frac{16}{2} = 8$$

To check:

$$\frac{x-5}{3} = \frac{x-3}{5}$$

$$\Rightarrow \frac{8-5}{3} = \frac{8-3}{5}$$

$$\Rightarrow \frac{3}{3} = \frac{5}{5}$$

$$\Rightarrow 1 = 1$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

$$5. \frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

$$\text{Ans. } \frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

$$\Rightarrow \frac{3t-2}{4} - \frac{2t+3}{3} + t = \frac{2}{3}$$

$$\Rightarrow \frac{3(3t-2) - 4(2t+3) + 12t}{12} = \frac{2}{3}$$

$$\Rightarrow \frac{9t-6-8t-12+12t}{12} = \frac{2}{3}$$

$$\Rightarrow \frac{13t-18}{12} = \frac{2}{3}$$

$$\Rightarrow 3 \times (13t-18) = 2 \times 12$$

$$\Rightarrow 39t-54 = 24$$

$$\Rightarrow 39t = 24 + 54$$

$$\Rightarrow 39t = 78$$

$$\Rightarrow t = \frac{78}{39} = 2$$

To check:

$$\frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

$$\Rightarrow \frac{3 \times 2 - 2}{4} - \frac{2 \times 2 + 3}{3} = \frac{2}{3} - 2$$

$$\Rightarrow \frac{6-2}{4} - \frac{4+3}{3} = \frac{2-6}{3}$$

$$\Rightarrow \frac{4}{4} - \frac{7}{3} = \frac{-4}{3}$$

$$\Rightarrow \frac{1}{1} - \frac{7}{3} = \frac{-4}{3}$$

$$\Rightarrow \frac{3-7}{3} = \frac{-4}{3}$$

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

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

6. $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$

Ans. $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$

$$\Rightarrow \frac{m}{1} - \frac{m-1}{2} + \frac{m-2}{3} = 1$$

$$\Rightarrow \frac{6m - 3(m-1) + 2(m-2)}{6} = 1$$

$$\Rightarrow \frac{6m - 3m + 3 + 2m - 4}{6} = 1$$

$$\Rightarrow \frac{5m-1}{6} = 1$$

$$\Rightarrow 5m - 1 = 6$$

$$\Rightarrow 5m = 6 + 1$$

$$\Rightarrow 5m = 7$$

$$\Rightarrow m = \frac{7}{5}$$

To check:

$$m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$$

$$\Rightarrow \frac{7}{5} - \frac{\frac{7}{5}-1}{2} = 1 - \frac{\frac{7}{5}-2}{3}$$

$$\Rightarrow \frac{7}{5} - \frac{\frac{7-5}{5}}{2} = 1 - \frac{\frac{7-10}{5}}{3}$$

$$\Rightarrow \frac{7}{5} - \frac{2}{5 \times 2} = 1 - \frac{-3}{5 \times 3}$$

$$\Rightarrow \frac{7}{5} - \frac{1}{5} = 1 + \frac{1}{5}$$

$$\Rightarrow \frac{7-1}{5} = \frac{5+1}{5}$$

$$\Rightarrow \frac{6}{5} = \frac{6}{5}$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

Simplify and solve the following linear equation.

7. $3(t-3) = 5(2t+1)$

Ans. $3(t-3) = 5(2t+1)$

$$\Rightarrow 3t - 9 = 10t + 5$$

$$\Rightarrow 3t - 10t = 5 + 9$$

$$\Rightarrow -7t = 14$$

$$\Rightarrow t = \frac{14}{-7}$$

$$\Rightarrow t = -2$$

To check:

$$3(t - 3) = 5(2t + 1)$$

$$\Rightarrow 3(-2 - 3) = 5\{2 \times (-2) + 1\}$$

$$\Rightarrow 3 \times -5 = 5(-4 + 1)$$

$$\Rightarrow -15 = 5 \times (-3)$$

$$\Rightarrow -15 = -15$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

8. $15(y - 4) - 2(y - 9) + 5(y + 6) = 0$

Ans. $15(y - 4) - 2(y - 9) + 5(y + 6) = 0$

$$\Rightarrow 15y - 60 - 2y + 18 + 5y + 30 = 0$$

$$\Rightarrow 18y - 12 = 0$$

$$\Rightarrow 18y = 12$$

$$\Rightarrow y = \frac{12}{18}$$

$$\Rightarrow y = \frac{2}{3}$$

To check:

$$15(y-4) - 2(y-9) + 5(y+6) = 0$$

$$\Rightarrow 15\left(\frac{2}{3}-4\right) - 2\left(\frac{2}{3}-9\right) + 5\left(\frac{2}{3}+6\right) = 0$$

$$\Rightarrow 15\left(\frac{2-12}{3}\right) - 2\left(\frac{2-27}{3}\right) + 5\left(\frac{2+18}{3}\right) = 0$$

$$\Rightarrow 15 \times \frac{-10}{3} - 2 \times \frac{-25}{3} + 5 \times \frac{20}{3} = 0$$

$$\Rightarrow -50 + \frac{50}{3} + \frac{100}{3} = 0$$

$$\Rightarrow -50 + \frac{50+100}{3} = 0$$

$$\Rightarrow -50 + \frac{150}{3} = 0$$

$$\Rightarrow -50 + 50 = 0$$

$$\Rightarrow 0 = 0$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

$$9. 3(5z-7) - 2(9z-11) = 4(8z-13) - 17$$

$$\text{Ans. } 3(5z-7) - 2(9z-11) = 4(8z-13) - 17$$

$$\Rightarrow 15z - 21 - 18z + 22 = 32z - 52 - 17$$

$$\Rightarrow -3z + 1 = 32z - 69$$

$$\Rightarrow -3z - 32z = -69 - 1$$

$$\Rightarrow -35z = -70$$

$$\Rightarrow z = \frac{-70}{-35} = 2$$

To check:

$$3(5z - 7) - 2(9z - 11) = 4(8z - 13) - 17$$

$$\Rightarrow 3(5 \times 2 - 7) - 2(9 \times 2 - 11) = 4(8 \times 2 - 13) - 17$$

$$\Rightarrow 3(10 - 7) - 2(18 - 11) = 4(16 - 13) - 17$$

$$\Rightarrow 3 \times 3 - 2 \times 7 = 4 \times 3 - 17$$

$$\Rightarrow 9 - 14 = 12 - 17$$

$$\Rightarrow -5 = -5$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

10. $0.25(4f - 3) = 0.05(10f - 9)$

Ans. $0.25(4f - 3) = 0.05(10f - 9)$

$$\Rightarrow 1.00f - 0.75 = 0.50f - 0.45$$

$$\Rightarrow 1.00f - 0.50f = -0.45 + 0.75$$

$$\Rightarrow 0.50f = 0.3$$

$$\Rightarrow f = \frac{0.3}{0.50}$$

$$\Rightarrow f = 0.6$$

To check:

$$0.25(4f - 3) = 0.05(10f - 9)$$

$$\Rightarrow 0.25(4 \times 0.6 - 3) = 0.05(10 \times 0.6 - 9)$$

$$\Rightarrow 0.25(2.4 - 3) = 0.05(6.0 - 9)$$

$$\Rightarrow 0.25 \times (-0.6) = 0.05 \times (-3)$$

$$\Rightarrow -0.150 = -0.150$$

$$\Rightarrow \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.