

## Exercise 2.2 (Revised) - Chapter 2 - Linear Equations In One Variable - Ncert Solutions class 8 - Maths

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# NCERT Solutions for Class 8 Maths Chapter 2 - Linear Equations in One Variable

Solve the following linear equations.

**Ex 2.2 Question 1.**

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

**Answer.**

$$\begin{aligned}\frac{x}{2} - \frac{1}{5} &= \frac{x}{3} + \frac{1}{4} \\ \Rightarrow \frac{x}{2} - \frac{x}{3} &= \frac{1}{4} + \frac{1}{5} \\ \Rightarrow \frac{3x - 2x}{6} &= \frac{5 + 4}{20} \\ \Rightarrow \frac{x}{6} &= \frac{9}{20} \\ \Rightarrow x &= \frac{9 \times 6}{20} = \frac{27}{10}\end{aligned}$$

To check:

$$\begin{aligned}\frac{x}{2} - \frac{1}{5} &= \frac{x}{3} + \frac{1}{4} \\ \Rightarrow \frac{27}{10 \times 2} - \frac{1}{5} &= \frac{27}{10 \times 3} + \frac{1}{4} \\ \Rightarrow \frac{27}{20} - \frac{1}{5} &= \frac{9}{10} + \frac{1}{4} \\ \Rightarrow \frac{27 - 4}{20} &= \frac{18 + 5}{20} \\ \Rightarrow \frac{23}{20} &= \frac{23}{20} \\ \Rightarrow \text{L.H.S.} &= \text{R. H. S.}\end{aligned}$$

Therefore, it is correct.

**Ex 2.2 Question 2.**

$$\begin{aligned}\frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} &= 21 \\ \text{Answer. } \frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} &= 21 \\ \Rightarrow \frac{6n - 9n + 10n}{12} &= 21 \\ \Rightarrow \frac{7n}{12} &= 21 \\ \Rightarrow n &= \frac{21 \times 12}{7} \\ \Rightarrow n &= 36\end{aligned}$$

To check:



$$\begin{aligned}\frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} &= 21 \\ \Rightarrow \frac{36}{2} - \frac{3 \times 36}{4} + \frac{5 \times 36}{6} &= 21 \\ \Rightarrow 18 - 27 + 30 &= 21 \\ \Rightarrow 21 &= 21 \\ \Rightarrow \text{L.H.S.} &= \text{R.H.S.}\end{aligned}$$

Therefore, it is correct.

#### Ex 2.2 Question 3.

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

**Answer.**

$$\begin{aligned}x + 7 - \frac{8x}{3} &= \frac{17}{6} - \frac{5x}{2} \\ \Rightarrow \frac{x}{1} - \frac{8x}{3} + \frac{5x}{2} &= \frac{17}{6} - \frac{7}{1} \\ \Rightarrow \frac{6x - 16x + 15x}{6} &= \frac{17 - 42}{6} \\ \Rightarrow \frac{5x}{6} &= \frac{-25}{6} \\ \Rightarrow x &= \frac{-25 \times 6}{6 \times 5} \\ \Rightarrow x &= -5\end{aligned}$$

To check:

$$\begin{aligned}x + 7 - \frac{8x}{3} &= \frac{17}{6} - \frac{5x}{2} \\ \Rightarrow -5 + 7 - \frac{8 \times (-5)}{3} &= \frac{17}{6} - \frac{5 \times (-5)}{2} \\ \Rightarrow 2 + \frac{40}{3} &= \frac{17}{6} + \frac{25}{2} \\ \Rightarrow \frac{6 + 40}{3} &= \frac{17 + 75}{6} \\ \Rightarrow \frac{46}{3} &= \frac{92}{6} \\ \Rightarrow \frac{46}{3} &= \frac{46}{3}\end{aligned}$$

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

Therefore, it is correct.

#### Ex 2.2 Question 4.

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

**Answer.**

$$\begin{aligned}\frac{x-5}{3} &= \frac{x-3}{5} \\ \Rightarrow 5 \times (x-5) &= 3(x-3) \\ \Rightarrow 5x - 25 &= 3x - 9 \\ \Rightarrow 5x - 3x &= -9 + 25 \\ \Rightarrow 2x &= 16 \\ \Rightarrow x &= \frac{16}{2} = 8\end{aligned}$$

To check:

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

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

Therefore, it is correct.

#### Ex 2.2 Question 5.

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

**Answer.**

$$\begin{aligned}\frac{3t-2}{4} - \frac{2t+3}{3} &= \frac{2}{3} - t \\ \Rightarrow \frac{3t-2}{4} - \frac{2t+3}{3} + t &= \frac{2}{3} \\ \Rightarrow \frac{3(3t-2) - 4(2t+3) + 12t}{12} &= \frac{2}{3} \\ \Rightarrow \frac{9t-6-8t-12+12t}{12} &= \frac{2}{3} \\ \Rightarrow \frac{13t-18}{12} &= \frac{2}{3} \\ \Rightarrow 3 \times (13t-18) &= 2 \times 12 \\ \Rightarrow 39t-54 &= 24 \\ \Rightarrow 39t &= 24+54 \\ \Rightarrow 39t &= 78\end{aligned}$$



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

To check:

$$\begin{aligned} \frac{3t-2}{4} - \frac{2t+3}{3} &= \frac{2}{3} - t \\ \Rightarrow \frac{3 \times 2 - 2}{4} - \frac{2 \times 2 + 3}{3} &= \frac{2}{3} - 2 \\ \Rightarrow \frac{6-2}{4} - \frac{4+3}{3} &= \frac{2-6}{3} \\ \Rightarrow \frac{4}{4} - \frac{7}{3} &= \frac{-4}{3} \\ \Rightarrow \frac{1}{1} - \frac{7}{3} &= \frac{-4}{3} \\ \Rightarrow \frac{3-7}{3} &= \frac{-4}{3} \\ \Rightarrow \frac{-4}{3} &= \frac{-4}{3} \\ \Rightarrow \text{L.H.S.} &= \text{R.H.S.} \end{aligned}$$

Therefore, it is correct.

#### Ex 2.2 Question 6.

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

**Answer.**

$$\begin{aligned} m - \frac{m-1}{2} &= 1 - \frac{m-2}{3} \\ \Rightarrow \frac{m}{1} - \frac{m-1}{2} + \frac{m-2}{3} &= 1 \\ \Rightarrow \frac{6m - 3(m-1) + 2(m-2)}{6} &= 1 \\ \Rightarrow \frac{6m - 3m + 3 + 2m - 4}{6} &= 1 \\ \Rightarrow \frac{5m - 1}{6} &= 1 \\ \Rightarrow 5m - 1 &= 6 \\ \Rightarrow 5m &= 6 + 1 \\ \Rightarrow 5m &= 7 \\ \Rightarrow m &= \frac{7}{5} \end{aligned}$$

To check:

$$\begin{aligned} m - \frac{m-1}{2} &= 1 - \frac{m-2}{3} \\ \Rightarrow \frac{7}{5} - \frac{\frac{7}{5} - 1}{2} &= 1 - \frac{\frac{7}{5} - 2}{3} \\ \Rightarrow \frac{7}{5} - \frac{\frac{7-5}{5}}{2} &= 1 - \frac{\frac{7-10}{5}}{3} \\ \Rightarrow \frac{7}{5} - \frac{2}{5 \times 2} &= 1 - \frac{-3}{5 \times 3} \\ \Rightarrow \frac{7}{5} - \frac{1}{5} &= 1 + \frac{1}{5} \\ \Rightarrow \frac{7-1}{5} &= \frac{5+1}{5} \\ \Rightarrow \frac{6}{5} &= \frac{6}{5} \\ \Rightarrow \text{L.H.S.} &= \text{R.H.S.} \end{aligned}$$

Therefore, it is correct.

Simplify and solve the following linear equation.

#### Ex 2.2 Question 7.

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

**Answer.**

$$\begin{aligned} 3(t-3) &= 5(2t+1) \\ \Rightarrow 3t - 9 &= 10t + 5 \\ \Rightarrow 3t - 10t &= 5 + 9 \\ \Rightarrow -7t &= 14 \\ \Rightarrow t &= \frac{14}{-7} \\ \Rightarrow t &= -2 \end{aligned}$$

To check:

$$\begin{aligned}3(t - 3) &= 5(2t + 1) \\ \Rightarrow 3(-2 - 3) &= 5\{2 \times (-2) + 1\} \\ \Rightarrow 3 \times -5 &= 5(-4 + 1) \\ \Rightarrow -15 &= 5 \times (-3) \\ \Rightarrow -15 &= -15 \\ \Rightarrow \text{L.H.S.} &= \text{R. H.S.}\end{aligned}$$

Therefore, it is correct.

**Ex 2.2 Question 8.**

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

$$\begin{aligned}\text{Answer. } 15(y - 4) - 2(y - 9) + 5(y + 6) &= 0 \\ \Rightarrow 15y - 60 - 2y + 18 + 5y + 30 &= 0 \\ \Rightarrow 18y - 12 &= 0 \\ \Rightarrow 18y &= 12 \\ \Rightarrow y &= \frac{12}{18} \\ \Rightarrow y &= \frac{2}{3}\end{aligned}$$

To check:

$$\begin{aligned}15(y - 4) - 2(y - 9) + 5(y + 6) &= 0 \\ \Rightarrow 15\left(\frac{2}{3} - 4\right) - 2\left(\frac{2}{3} - 9\right) + 5\left(\frac{2}{3} + 6\right) &= 0 \\ \Rightarrow 15\left(\frac{2 - 12}{3}\right) - 2\left(\frac{2 - 27}{3}\right) + 5\left(\frac{2 + 18}{3}\right) &= 0 \\ \Rightarrow 15 \times \frac{-10}{3} - 2 \times \frac{-25}{3} + 5 \times \frac{20}{3} &= 0 \\ \Rightarrow -50 + \frac{50}{3} + \frac{100}{3} &= 0 \\ \Rightarrow -50 + \frac{50 + 100}{3} &= 0 \\ \Rightarrow -50 + \frac{150}{3} &= 0 \\ \Rightarrow -50 + 50 &= 0 \\ \Rightarrow 0 &= 0 \\ \Rightarrow \text{L.H.S.} &= \text{R. H. S.}\end{aligned}$$

Therefore, it is correct.

**Ex 2.2 Question 9.**

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

**Answer.**

$$\begin{aligned}3(5z - 7) - 2(9z - 11) &= 4(8z - 13) - 17 \\ \Rightarrow 15z - 21 - 18z + 22 &= 32z - 52 - 17 \\ \Rightarrow -3z + 1 &= 32z - 69 \\ \Rightarrow -3z - 32z &= -69 - 1 \\ \Rightarrow -35z &= -70 \\ \Rightarrow z &= \frac{-70}{-35} = 2\end{aligned}$$

To check:

$$\begin{aligned}3(5z - 7) - 2(9z - 11) &= 4(8z - 13) - 17 \\ \Rightarrow 3(5 \times 2 - 7) - 2(9 \times 2 - 11) &= 4(8 \times 2 - 13) - 17 \\ \Rightarrow 3(10 - 7) - 2(18 - 11) &= 4(16 - 13) - 17 \\ \Rightarrow 3 \times 3 - 2 \times 7 &= 4 \times 3 - 17 \\ \Rightarrow 9 - 14 &= 12 - 17 \\ \Rightarrow -5 &= -5 \\ \Rightarrow \text{L.H.S.} &= \text{R. H.S.}\end{aligned}$$

Therefore, it is correct.

**Ex 2.2 Question 10.**

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

**Answer.**

$$\begin{aligned}
0.25(4f - 3) &= 0.05(10f - 9) \\
\Rightarrow 1.00f - 0.75 &= 0.50f - 0.45 \\
\Rightarrow 1.00f - 0.50f &= -0.45 + 0.75 \\
\Rightarrow 0.50f &= 0.3 \\
\Rightarrow f &= \frac{0.3}{0.50} \\
\Rightarrow f &= 0.6
\end{aligned}$$

To check:

$$\begin{aligned}
0.25(4f - 3) &= 0.05(10f - 9) \\
\Rightarrow 0.25(4 \times 0.6 - 3) &= 0.05(10 \times 0.6 - 9) \\
\Rightarrow 0.25(2.4 - 3) &= 0.05(6.0 - 9) \\
\Rightarrow 0.25 \times (-0.6) &= 0.05 \times (-3) \\
\Rightarrow -0.150 &= -0.150 \\
\Rightarrow \text{L.H.S.} &= \text{R. H.S.}
\end{aligned}$$

Therefore, it is correct.