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.

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

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.

Ex 2.2 Question 2.

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

To check:

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

Therefore, it is correct.

Ex 2.2 Question 3.

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

Answer.

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

To check:

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

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

Therefore, it is correct.

Ex 2.2 Question 4.

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

Answer.

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

To check:

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

$\Rightarrow$ L.H.S. $=$ 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.

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

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

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.

Ex 2.2 Question 6.

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

Answer.

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

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.

Ex 2.2 Question 7.

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

Answer.

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

To check:

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

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

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

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

$\Rightarrow -15=-15$

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

Therefore, it is correct.

Ex 2.2 Question 8.

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

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

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

$\Rightarrow 18y-12=0$

$\Rightarrow 18y=12$

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

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

To check:

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

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

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

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

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

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

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

$\Rightarrow -50+50=0$

$\Rightarrow 0=0$

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

Therefore, it is correct.

Ex 2.2 Question 9.

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

Answer.

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

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

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

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

$\Rightarrow -35z=-70$

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

To check:

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

$\Rightarrow 3(5\times2-7)-2(9\times2-11)=4(8\times2-13)-17$

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

$\Rightarrow 3\times3-2\times7=4\times3-17$

$\Rightarrow 9-14=12-17$

$\Rightarrow -5=-5$

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

Therefore, it is correct.

Ex 2.2 Question 10.

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

Answer.

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

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.