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CLASS 8th

MATHS

CHAPTER- 2nd

Linear Equations in One Variable

EXERCISE- 2.1

NCERT SOLUTION

Solve the following equations and check your results.

1. $3x = 2x + 18$

Ans.

$3x = 2x + 18$

$3x - 2x = 18$

$x = 18$

To check:

$3x = 2x + 18$

$3 \times 18 = 2 \times 18 + 18$

$54 = 36 + 18$

$54 = 54$

L.H.S = R.H.S

2. $5t - 3 = 3t - 5$

Ans.

$5t - 3 = 3t - 5$

$5t - 3t = -5 + 3$

$2t = -2$

$t = \frac{-2}{2} = -1$

To check:

$5t - 3 = 3t - 5$

$5 \times (-1) = 3 \times (-1) - 5$

$-5 - 3 = -3 - 5$

$-8 = -8$

L.H.S = R.H.S

3. $5x + 9 = 5 + 3x$

Ans.

$5x + 9 = 5 + 3x$

$5x - 3x = 5 - 9$

$2x = -4$

$x = \frac{-4}{2} = -2$

To check:

$5x + 9 = 5 + 3x$

$5 \times (-2) + 9 = 5 + 3 \times (-2)$

$-10 + 9 = 5 + (-6)$

$-1 = -1$

L.H.S = R.H.S

4. $4z + 3 = 6 + 2z$

Ans.

$4z + 3 = 6 + 2z$

$4z - 2z = 6 - 3$

$2z = 3$

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

To check:

$4z + 3 = 6 + 2z$

$4 \times \frac{3}{2} + 3 = 6 + 2 \times \frac{3}{2}$

$6 + 3 = 6 + 3$

$9 = 9$

L.H.S = R.H.S

5. $2x - 1 = 14 - x$

Ans.

$2x - 1 = 14 - x$

$2x + x = 14 + 1$

$3x = 15$

$x = \frac{15}{3} = 5$

To check:

$2x - 1 = 14 - x$

$2 \times 5 - 1 = 14 - 5$
$10 - 1 = 14 - 5$
$9 = 9$
L.H.S = R.H.S

6. $8x + 4 = 3\,(x - 1) + 7$
Ans.
$8\,x + 4 = 3\,(x - 1) + 7$
$8\,x + 4 = 3\,x - 3 + 7$
$8\,x + 4 = 3\,x + 4$
$8\,x - 3\,x = 4 - 4$
$5\,x = 0$
$x = \frac{0}{5}$
To check:
$8\,x + 4 = 3\,(x - 1) + 7$
$8 \times \frac{0}{5} + 4 = 3(\frac{0}{5} - 1)$
$0 + 4 = 0 - 3 + 7$
$4 = 4$
L.H.S = R.H.S

7. $x = \frac{4}{5}\,(\,x + 10)$
Ans.
$x = \frac{4}{5}\,(\,x + 10)$
$5x = 4\,(x + 10)$
$5x = 4x + 40$
$5x - 4x = 40$
$x = 40$
To check:
$x = \frac{4}{5}\,(\,x + 10)$
$40 = \frac{4}{5}(\,40 + 10)$
$40 = \frac{4}{5} \times 50$
$40 = 40$
L.H.S = R.H.S

8. $\frac{2x}{3}+1=\frac{7x}{15}+3$

Ans.

$\frac{2x}{3}+1=\frac{7x}{15}+3$

$\frac{2x}{3}-\frac{7x}{15}=-1+3$

$\frac{10x-7x}{15}=2$

$\frac{3x}{15}=2$

$3x=2\text{ x }15$

$3x=30$

$x=\frac{30}{3}=10$

To check:

$\frac{2x}{3}+1=\frac{7x}{15}+3$

$\frac{2\times10}{3}+1=\frac{7\times10}{15}+3$

$\frac{20}{3}+1=\frac{70}{15}+3$

$\frac{20}{3}+1=\frac{14}{3}+3$

$\frac{20+3}{3}=\frac{14+9}{3}$

$\frac{23}{3}=\frac{23}{3}$

L.H.S = R.H.S

9. $2y+\frac{5}{3}=\frac{26}{3}-y$

Ans.

$2y+\frac{5}{3}=\frac{26}{3}-y$

$2y+y=\frac{26}{3}-\frac{5}{3}$

$3y=\frac{26-5}{3}$

$y=\frac{21}{3\times3}=\frac{7}{3}$

To check:

$2y+\frac{5}{3}=\frac{26}{3}-y$

$2\text{ x }\frac{7}{3}+\frac{5}{3}=\frac{26}{3}-\frac{7}{3}$

$\frac{14}{3} + \frac{5}{3} = \frac{26}{3} - \frac{7}{3}$

$\frac{14+5}{3} = \frac{26-7}{3}$

$\frac{19}{3} = \frac{19}{3}$

L.H.S = R.H.S

10. $3m = 5m - \frac{8}{5}$

Ans.

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

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

$-2m = -\frac{8}{5}$

$m = \frac{-8}{5 \times (-2)}$

$m = \frac{-8}{-10} = = \frac{4}{5}$

To check:

$3 \text{ x } \frac{4}{5} = 5 \text{ x } \frac{4}{5} - \frac{8}{5}$

$\frac{12}{5} = \frac{20-8}{5}$

$\frac{12}{5} = \frac{12}{5}$

L.H.S = R.H.S

EXERCISE-2.2

NCERT SOLUTION

Solve the following linear equations.

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

Ans.

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

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

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

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

$x=\frac{9\times6}{20}=\frac{27}{10}$

To check:

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

$\frac{27}{10\times2}-\frac{1}{5}=\frac{27}{10\times3}+\frac{1}{4}$

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

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

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

L.H.S = R.H.S

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

Ans.

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

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

$n=\frac{21\times12}{7}=36$

To check:

$\frac{36}{2} - \frac{3\times36}{4} + \frac{5\times36}{6} = 21$

$18 - 27 + 30 = 21$

$21 = 21$

L.H.S = R.H.S

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

Ans.

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

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

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

$x = \frac{-25\times6}{6\times3} = -5$

To check:

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

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

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

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

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

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

L.H.S = R.H.S

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

Ans.

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

$5(x-5) = 3(x-3)$

$5x - 25 = 3x - 9$

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

$2x = 16$

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

To check:

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

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

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

$1 = 1$

L.H.S = R.H.S

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

Ans.

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

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

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

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

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

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

$39t - 54 = 24$

$39t = 54 + 24$

$39t = 78$

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

To Check:

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

$\frac{3\times2-2}{4} - \frac{2\times2+3}{3} = \frac{2}{3} - 2$

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

$\frac{4}{4} - \frac{7}{3} = \frac{2}{3} - 2$

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

$\frac{3-7}{3} = \frac{2-6}{3}$

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

L.H.S = R.H.S

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

Ans.

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

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

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

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

$5m - 1 = 1 \times 6$

$5m - 1 = 6$

$5m = 6 + 1$

$5m = 7$

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

To check:

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

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

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

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

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

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

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

L.H.S = R.H.S

7. Simplify and solve the following equation: $3(t-3) = 5(2t+1)$

Ans.

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

$3t - 9 = 10t + 5$

$3t - 10t = 5 + 9$

$-7t = 14$

$t = \frac{14}{-7} = -2$

To check:

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

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

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

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

$-15 = -15$

L.H.S = R.H.S

8. Simplify and solve the following equation: $15(y-4) - 2(y-9) + 5(y+6) = 0$

Ans.

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

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

$18y - 12 = 0$

$y = \frac{12}{18} = \frac{2}{3}$

To check:

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

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

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

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

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

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

$-50 + 50 = 0$

$0 =$

L.H.S = R.H.S

9. Simplify and solve the following equation: 3(5z – 7) – 2 (9z – 11) = 4(8z − 13) – 17

Ans.

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

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

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

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

$-35z = -70$

$Z = \frac{-70}{-35} = 2$

To check:

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

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

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

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

$9 - 14 = 12 - 17$

$-5 = -5$

L.H.S = R.H.S

10. Simplify and solve the following equation: 0.25 $(4f - 3) =$ 0.05 $(10f - 9)$

Ans.

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

$1.00f - 0.75 = 0.50f - 0.45$

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

$0.50f = 0.3$

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

$f = 0.6$

To check:

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

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

$0.25(2.4 - 3) = 0.05(6 - 9)$

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

$-0.150 = -0.150$

L.H.S = R.H.S

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