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Chapter – 02

Linear Equations in One Variable

Exercises 2.5

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Question 1. Solve the following linear equations.

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

Answer:

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

L.C.M of 2 and 5 = 10 and L.C.M of 3 and 4 = 12Therefore, $\frac{5x-2}{10} = \frac{4x+3}{12}$

Cross Multiplying we get,12(5 x - 2) = 10(4 x + 3)60 x - 24 = 40 x + 3060 x - 40 x = 30 + 2420 x

$$x = \frac{54}{20}$$

$$= 54$$

$$x = \frac{27}{10}$$

Question 2. Solve the following linear equations.

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

Answer:

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

L.C.M. of 2,6, and 4 is 12

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

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

Cross multiplying we get,

Thus,

$$7n = 12 \times 21$$

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

$$n = 12 \times 3$$

$$n = 36$$

Question 3. Solve the following linear equations.

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

Answer:

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

As the equation contains variable as well as constants. First step should be taking variables at one side and constants at other side. Therefore, the equation becomes

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

L.C.M of 3 and 2 = 6 and on right hand side L.C.M. will be just 6

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

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

As the denominator is same, it gets cancelled out.

$5x = -25$

$x = \dfrac{-25}{5}$

$x = -5$

Question 4. Solve the following linear equations.

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

Answer:

Method 1:

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

Cross multiplying we get,

5 (x - 5) = 3 (x - 3)5 x - 25 = 3 x - 95 x - 3 x = 25 - 92 x = 16x = 16/2x = 8

Question 5. Solve the following linear equation.

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

Answer:

$\left(\dfrac{3\,t-2}{4} - \dfrac{2\,t+3}{3}\right) = \dfrac{2}{3} - t$

L.C.M of 4 and 3 is 12

Thus,

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

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

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

Cross Multiplying, we get,

$$3\,(t-18) = 12\,(2-3\,t)$$

$$3\,t-54 = 24-36\,t$$

$$39\,t = 78$$

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

$$t = 2$$

Question 6. Solve the following linear equations.

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

Answer:

To Solve: $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$

Taking L.C.M on both sides we get,

$$\frac{2\,m-(m-1)}{2} = \frac{3-(m-2)}{3}$$

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

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

Cross Multiplying we get, $3\,(m+1) = 2\,(5-m)3\,m+3 = 10 - 2\,m3\,m+2\,m = 10-35\,m = 7$

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

Question 7. Simplify and solve the following linear equations.

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

Answer:

Opening the brackets, we write,

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

$$-9 - 5 = 10t - 3t$$

$$-14 = 7t$$

$$t = -2$$

Question 8. Simplify and solve the following linear equations.

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

Answer:

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

Opening brackets 15y - 15 x 4 - 2y + 2 x 9 + 5y + 5 x 6 = 015y - 60 - 2y + 18 + 5y + 30 = 0(15y - $y = \frac{12}{18}$ 2y + 5y) + 30 + 18 - 60 = 018 y - 12 = 018 y = 12 $y = \frac{2}{3}$

Question 9. Simplify and solve the following linear equations.

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

Answer:

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

Opening the brackets, we write,

15z – 21 – 18z + 22 = 32z -52 -17

15z - 18z - 21 + 22 = 32z - 69

-3z + 1 = 32z – 69

-3z - 32z = -69 - 1- 35z = -70 35z = 70z = 2

Question 10. Simplify and solve the following linear equations.

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

Answer:

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

Opening Brackets, Multiply Component-wisely0.25 x 4 f - 0.25 x 3 = 0.05 x 10 f - 0.05 x 9f - 0.75 = 0.5 f - 0.45f - 0.5 f = 0.75 - 0.450.5 f = 0.30f = 0.30/0.5f = 0.6