

Linear Equations in One Variable: Exercise 2.5

Solve the following linear equations.

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

Sol. Given equation: $\frac{x}{2} - \frac{1}{5} = \frac{x}{3} + \frac{1}{4}$

Taking all the variable terms in left side and constant term in right side,

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

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

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

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

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

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

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

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

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

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

$$n = 36$$

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

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

Taking all the variable terms in left side and constant term in right side,

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

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

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

$$x = -5$$

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

$$\text{Sol. Given equation: } \frac{x-5}{3} = \frac{x-3}{5}$$

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

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

Taking all the variable terms in left side and constant term in right side,

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

$$2x = 16$$

$$x = 16/2 = 8$$

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

$$\text{Sol. Given Equation: } \frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

Taking all the variable terms in left side and constant term in right side,

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

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

$$\frac{9t-6-8t-12+12t}{4} = \frac{2}{3}$$

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

By cross multiply,

$$39t - 54 = 24$$

Now take the constant term in right hand side,

$$39t = 24 + 54$$

$$39t = 78$$

$$t = 78/39$$

$$t = 2$$

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

$$\text{Sol. Given equation: } m - \frac{m-1}{2} + \frac{m-2}{3} = 1$$

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

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

$$5m - 1 = 6$$

Now take the constant term in right hand side,

$$5m = 6 + 1$$

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

Simplify and solve the following linear equations.

$$\text{Q.7 } 3(t - 3) = 5(2t + 1)$$

$$\text{Sol. Given Equation: } 3(t-3) = 5(2t+1)$$

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

Taking all the variable terms in left side and constant term in right side,

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

$$-7t = 14$$

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

$$t = -2$$

$$\text{Q.8 } 15(y - 4) - 2(y - 9) + 5(y + 6) = 0$$

$$\text{Sol. Given equation: } 15(y - 4) - 2(y - 9) + 5(y + 6) = 0$$

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

$$18y - 12 = 0$$

Taking all the variable terms in left side and constant term in right side,

$$18y = 12$$

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

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

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

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

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

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

Taking all the variable terms in left side and constant term in right side,

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

$$-35z = -70$$

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

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

Sol. Given equation: $0.25(4f - 3) = 0.05(10f - 9)$

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

Taking all the variable terms in left side and constant term in right side,

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

$$0.50f = 0.3$$

$$f = \frac{0.30}{0.50}$$

$$f = 0.6$$