



Exercise 8A

Q9.

Answer :

$$\begin{aligned} \frac{x-5}{2} - \frac{x-3}{5} &= \frac{1}{2} \\ \Rightarrow 10 \left(\frac{x-5}{2} \right) - 10 \left(\frac{x-3}{5} \right) &= 10 \left(\frac{1}{2} \right) \quad \left(\text{multiplying throughout by 10, which is} \right. \\ &\quad \left. \text{the L.C.M. of 2, 2 and 5} \right) \Rightarrow 5(x-5) - 2(x-3) = 5 \Rightarrow 5x - 25 - 2x + 6 \\ &= 5 \Rightarrow 5x - 2x - 25 + 6 = 5 \Rightarrow 3x - 19 = 5 \Rightarrow 3x = 5 + 19 \Rightarrow 3x = 24 \Rightarrow x \\ &= \frac{24}{3} = 8. \therefore x = 8 \end{aligned}$$

Q10.

Answer :

$$\begin{aligned} \frac{3t-2}{4} - \frac{2t+3}{3} &= \frac{2}{3} - t \\ \Rightarrow \frac{3t-2}{4} - \frac{2t+3}{3} &= \frac{2-3t}{3} \quad \left(3 \text{ is the L.C.M. of 1 and 3} \right) \\ \Rightarrow 12 \left(\frac{3t-2}{4} \right) - 12 \left(\frac{2t+3}{3} \right) &= 12 \left(\frac{2-3t}{3} \right) \quad \left(\text{multiplying throughout by 12, which} \right. \\ &\quad \left. \text{is the L.C.M. of 4, 3 and 3} \right) \\ \Rightarrow 3(3t-2) - 4(2t+3) &= 4(2-3t) \\ \Rightarrow 9t - 6 - 8t - 12 &= 8 - 12t \\ \Rightarrow 9t - 8t - 6 - 12 &= 8 - 12t \\ \Rightarrow t - 18 &= 8 - 12t \\ \Rightarrow t + 12t &= 18 + 8 \\ \Rightarrow 13t &= 26 \\ \Rightarrow t &= \frac{26}{13} = 2 \\ \therefore t &= 2 \end{aligned}$$

Q11.

Answer :

$$\begin{aligned} \frac{2x+7}{5} - \frac{3x+11}{2} &= \frac{2x+8}{3} - 5 \\ \Rightarrow \frac{2x+7}{5} - \frac{3x+11}{2} &= \frac{2x+8-15}{3} \quad \left(\text{L.C.M. of 3 and 1 is 3} \right) \\ \Rightarrow 30 \left(\frac{2x+7}{5} \right) - 30 \left(\frac{3x+11}{2} \right) &= 30 \left(\frac{2x+8-15}{3} \right) \\ \left(\text{multiplying throughout by 30, which is the L.C.M. of 5, 2 and 3} \right) \\ \Rightarrow 6(2x+7) - 15(3x+11) &= 10(2x+8-15) \Rightarrow 12x + 42 - 45x - 165 \\ &= 20x - 70 \Rightarrow 12x - 45x + 42 - 165 = 20x - 70 \Rightarrow -33x - 123 = 20x - 70 \Rightarrow \\ -33x - 20x &= 123 - 70 \Rightarrow -53x = 53 \Rightarrow x = \frac{53}{-53} \Rightarrow x = -1. \therefore x = -1 \end{aligned}$$

Q12.

Answer :

$$\begin{aligned} \frac{5x-4}{6} &= 4x + 1 - \frac{3x+10}{2} \\ \Rightarrow \frac{5x-4}{6} &= \frac{2(4x+1) - 3x - 10}{2} \quad \left(\text{L.C.M. of 1 and 2 is 2} \right) \\ \Rightarrow \frac{5x-4}{6} &= \frac{8x+2-3x-10}{2} \\ \Rightarrow \frac{5x-4}{6} &= \frac{5x-8}{2} \\ \Rightarrow \frac{5x-4}{6} &= \frac{5x-8}{2} \\ \Rightarrow 2(5x-4) &= 6(5x-8) \\ \Rightarrow 10x - 8 &= 30x - 48 \\ \Rightarrow 10x - 30x &= -48 + 8 \\ \Rightarrow -20x &= -40 \\ \Rightarrow x &= \frac{-40}{-20} = 2 \\ \therefore x &= 2 \end{aligned}$$

Q13.

Answer :

$$\begin{aligned}5x - \frac{1}{3}(x + 1) &= 6\left(x + \frac{1}{30}\right) \\ \Rightarrow 5x - \frac{1(x+1)}{3} &= 6\left(\frac{30x+1}{30}\right) \quad \left(\text{L.C.M. of 1 and 30 is 30}\right) \\ \Rightarrow 5x - \frac{(x+1)}{3} &= \frac{30x+1}{5} \\ \Rightarrow \frac{15x-x-1}{3} &= \frac{30x+1}{5} \quad \left(\text{L.C.M. of 1 and 3 is 3}\right) \\ \Rightarrow \frac{14x-1}{3} &= \frac{30x+1}{5} \\ \Rightarrow 5(14x-1) &= 3(30x+1) \quad \left(\text{by cross multiplication}\right) \\ \Rightarrow 70x-5 &= 90x+3 \\ \Rightarrow 70x-90x &= 3+5 \\ \Rightarrow -20x &= 8 \\ \Rightarrow x &= \frac{8}{-20} = \frac{-2}{5} \\ \therefore x &= -\frac{2}{5}\end{aligned}$$

Q14.

Answer :

$$\begin{aligned}4 - \frac{2(z-4)}{3} &= \frac{1}{2}(2z+5) \\ \Rightarrow \frac{12-2(z-4)}{3} &= \frac{1(2z+5)}{2} \quad \left(\text{L.C.M. of 1 and 3 is 3}\right) \\ \Rightarrow \frac{12-2z+8}{3} &= \frac{2z+5}{2} \\ \Rightarrow \frac{20-2z}{3} &= \frac{2z+5}{2}\end{aligned}$$

$$\Rightarrow 2(20 - 2z) = 3(2z + 5) \quad \left(\text{by cross multiplication} \right)$$

$$\Rightarrow 40 - 4z = 6z + 15$$

$$\Rightarrow 40 - 15 = 6z + 4z$$

$$\Rightarrow 25 = 10z$$

$$\Rightarrow 10z = 25 \quad \left(\text{by transposition} \right)$$

$$\Rightarrow z = \frac{25}{10} = \frac{5}{2}$$

$$\therefore z = \frac{5}{2}$$

Q15.

Answer :

$$\frac{3(y-5)}{4} - 4y = 3 - \frac{(y-3)}{2}$$

$$\Rightarrow \frac{3y-15}{4} - 4y = 3 - \frac{y-3}{2}$$

$$\Rightarrow \frac{3y-15-16y}{4} = 3 - \frac{y-3}{2} \quad \left(\text{L.C.M. of 4 and 1 is 4} \right)$$

$$\Rightarrow \frac{-13y-15}{4} = \frac{6-y+3}{2}$$

$$\Rightarrow \frac{-13y-15}{4} = \frac{9-y}{2}$$

$$\Rightarrow 2(-13y-15) = 4(9-y)$$

$$\Rightarrow -26y - 30 = 36 - 4y$$

$$\Rightarrow -26y + 4y = 36 + 30$$

$$\Rightarrow -22y = 66$$

$$\Rightarrow 22y = -66 \quad \left(\text{multiplying both the sides with a -ve sign} \right)$$

$$\Rightarrow y = -\frac{66}{22} = -3$$

$$\therefore y = -3$$

Q16.

Answer :

$$\begin{aligned}\frac{8x-3}{3x} &= 2 \\ \Rightarrow 8x - 3 &= 2(3x) \quad (\text{by cross multiplication}) \\ \Rightarrow 8x - 3 &= 6x \\ \Rightarrow 8x - 6x &= 3 \\ \Rightarrow 2x &= 3 \\ \Rightarrow x &= \frac{3}{2} \\ \therefore x &= \frac{3}{2}\end{aligned}$$

Q17.

Answer :

$$\begin{aligned}\frac{9x}{7-6x} &= 15 \\ \Rightarrow \frac{9x}{7-6x} &= \frac{15}{1} \\ \Rightarrow 1(9x) &= 15(7-6x) \quad (\text{by cross multiplication}) \\ \Rightarrow 9x &= 105 - 90x \\ \Rightarrow 9x + 90x &= 105 \\ \Rightarrow 99x &= 105 \\ \Rightarrow x &= \frac{105}{99} = \frac{35}{33} \\ \therefore x &= \frac{35}{33}\end{aligned}$$

Q18.

Answer :

$$\begin{aligned}\frac{3x}{5x+2} &= -4 \\ \Rightarrow \frac{3x}{5x+2} &= \frac{-4}{1} \\ \Rightarrow 1(3x) &= -4(5x+2) \quad (\text{by cross multiplication}) \\ \Rightarrow 3x &= -20x - 8 \\ \Rightarrow 3x + 20x &= -8 \\ \Rightarrow 23x &= -8 \\ \Rightarrow x &= \frac{-8}{23} \\ \therefore x &= \frac{-8}{23}\end{aligned}$$

Q20.

Answer :

$$\begin{aligned}\frac{2-9z}{17-4z} &= \frac{4}{5} \\ \Rightarrow 5(2-9z) &= 4(17-4z) \quad (\text{by cross multiplication}) \\ \Rightarrow 10 - 45z &= 68 - 16z \\ \Rightarrow 10 - 68 &= 45z - 16z \\ \Rightarrow -58 &= 29z \\ \Rightarrow 29z &= -58 \quad (\text{by transposition}) \\ \Rightarrow z &= \frac{-58}{29} = -2 \\ \therefore z &= -2\end{aligned}$$

Q21.

Answer :

$$\begin{aligned}\frac{4x+7}{9-3x} &= \frac{1}{4} \\ \Rightarrow 4(4x+7) &= 1(9-3x) \quad (\text{by cross multiplication}) \\ \Rightarrow 16x + 28 &= 9 - 3x \\ \Rightarrow 16x + 3x &= 9 - 28 \\ \Rightarrow 19x &= -19 \\ \Rightarrow x &= \frac{-19}{19} = -1 \\ \therefore x &= -1\end{aligned}$$

Q22.

Answer :

$$\begin{aligned}\frac{7y+4}{y+2} &= \frac{-4}{3} \\ \Rightarrow 3(7y+4) &= -4(y+2) \quad (\text{by cross multiplication}) \\ \Rightarrow 21y + 12 &= -4y - 8 \\ \Rightarrow 21y + 4y &= -8 - 12 \\ \Rightarrow 25y &= -20 \\ \Rightarrow y &= \frac{-20}{25} = \frac{-4}{5} \\ \therefore y &= \frac{-4}{5}\end{aligned}$$

Q23.

Answer :

$$\begin{aligned}\frac{15(2-y) - 5(y+6)}{1-3y} &= 10 \\ \Rightarrow \frac{30 - 15y - 5y - 30}{1-3y} &= 10 \\ \Rightarrow \frac{-20y}{1-3y} &= 10 \\ \Rightarrow 1(-20y) &= 10(1-3y) \quad (\text{by cross multiplication}) \\ \Rightarrow -20y &= 10 - 30y \\ \Rightarrow -20y + 30y &= 10 \\ \Rightarrow 10y &= 10 \\ \Rightarrow y &= \frac{10}{10} = 1 \\ \therefore y &= 1\end{aligned}$$

Q24.

Answer :

$$\begin{aligned}\frac{2x - (7 - 5x)}{9x - (3 + 4x)} &= \frac{7}{6} \\ \Rightarrow \frac{2x - 7 + 5x}{9x - 3 - 4x} &= \frac{7}{6} \\ \Rightarrow \frac{7x - 7}{5x - 3} &= \frac{7}{6} \\ \Rightarrow 6(7x - 7) &= 7(5x - 3) \quad (\text{by cross multiplication}) \\ \Rightarrow 42x - 42 &= 35x - 21 \\ \Rightarrow 42x - 35x &= 42 - 21 \\ \Rightarrow 7x &= 21 \\ \Rightarrow x &= \frac{21}{7} = 3 \\ \therefore x &= 3\end{aligned}$$

Q25.

Answer :

$$\begin{aligned}m - \frac{(m-1)}{2} &= 1 - \frac{(m-2)}{3} \\ \Rightarrow \frac{2m - m + 1}{2} &= 1 - \frac{(m-2)}{3} \quad \left(L.C.M. \text{ of } 1 \text{ and } 2 \text{ is } 2 \right) \\ \Rightarrow \frac{m+1}{2} &= \frac{3-m+2}{3} \quad \left(L.C.M. \text{ of } 1 \text{ and } 3 \text{ is } 3 \right) \\ \Rightarrow \frac{m+1}{2} &= \frac{5-m}{3} \\ \Rightarrow 3(m+1) &= 2(5-m) \quad (\text{by cross multiplication}) \\ \Rightarrow 3m + 3 &= 10 - 2m \\ \Rightarrow 3m + 2m &= 10 - 3 \\ \Rightarrow 5m &= 7 \\ \Rightarrow m &= \frac{7}{5} \\ \therefore m &= \frac{7}{5}\end{aligned}$$

Q26.

Answer :

$$\begin{aligned}\frac{3x+5}{4x+2} &= \frac{3x+4}{4x+7} \\ \Rightarrow (4x+7)(3x+5) &= (4x+2)(3x+4) \quad (\text{by cross multiplication}) \\ \Rightarrow 12x^2 + 20x + 21x + 35 &= 12x^2 + 16x + 6x + 8 \\ \Rightarrow 12x^2 + 41x + 35 &= 12x^2 + 22x + 8 \\ \Rightarrow 12x^2 - 12x^2 + 41x - 22x &= 8 - 35 \\ \Rightarrow 19x &= -27 \\ \Rightarrow x &= \frac{-27}{19} \\ \therefore x &= \frac{-27}{19}\end{aligned}$$

Q27.

Answer :

$$\begin{aligned}\frac{9x-7}{3x+5} &= \frac{3x-4}{x+6} \\ \Rightarrow (x+6)(9x-7) &= (3x+5)(3x-4) \\ (\text{by cross multiplication}) \\ \Rightarrow 9x^2 - 7x + 54x - 42 &= 9x^2 - 12x + 15x - 20 \\ \Rightarrow 9x^2 + 47x - 42 &= 9x^2 + 3x - 20 \\ \Rightarrow 9x^2 - 9x^2 + 47x - 3x &= -20 + 42 \\ \Rightarrow 44x &= 22 \\ \Rightarrow x &= \frac{22}{44} = \frac{1}{2} \\ \therefore x &= \frac{1}{2}\end{aligned}$$

Q28.

Answer :

$$\frac{2-7x}{1-5x} = \frac{3+7x}{4+5x}$$

$$\Rightarrow (4+5x)(2-7x) = (1-5x)(3+7x) \quad (\text{by cross multiplication})$$

$$\Rightarrow 8 - 28x + 10x - 35x^2 = 3 + 7x - 15x - 35x^2$$

$$\Rightarrow -35x^2 - 18x + 8 = -35x^2 - 8x + 3$$

$$\Rightarrow -35x^2 + 35x^2 - 18x + 8x = -8 + 3$$

$$\Rightarrow -10x = -5$$

$$\Rightarrow x = \frac{-5}{-10} = \frac{1}{2}$$

$$\therefore x = \frac{1}{2}$$

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