Exercise 2.5 : Solutions of Questions on Page Number : 33

Q1 :

Solve the linear equation $\frac{x}{2}-\frac{1}{5}=\frac{x}{3}+\frac{1}{4}$

Answer :

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

L.C.M. of the denominators, 2, 3, 4, and 5, is 60.

Multiplying both sides by 60, we obtain

$$60\left(\frac{x}{2}-\frac{1}{5}\right)=60\left(\frac{x}{3}+\frac{1}{4}\right)$$

$\Rightarrow 30x - 12 = 20x + 15$ (Opening the brackets)

$\Rightarrow 30x - 20x = 15 + 12$

$\Rightarrow 10x = 27$

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

Q2 :

Solve the linear equation $\frac{n}{2}-\frac{3n}{4}+\frac{5n}{6}=21$

Answer :

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

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

Multiplying both sides by 12, we obtain

$6n - 9n + 10n = 252$

$\Rightarrow 7n = 252$

$$\Rightarrow n=\frac{252}{7}$$
$$\Rightarrow n=36$$

Q3 :

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

Answer :

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

L.C.M. of the denominators, 2, 3, and 6, is 6.

Multiplying both sides by 6, we obtain

$6x + 42 - 16x = 17 - 15x$

$\Rightarrow 6x - 16x + 15x = 17 - 42$

$\Rightarrow 5x = -25$

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

Q4 :

Solve the linear equation $\frac{x-5}{3}=\frac{x-3}{5}$

Answer :

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

L.C.M. of the denominators, 3 and 5, is 15.

Multiplying both sides by 15, we obtain

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

$\Rightarrow 5x - 25 = 3x - 9$ (Opening the brackets)

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

$\Rightarrow 2x = 16$

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

Q5 :

Solve the linear equation $\frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$

Answer :

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

L.C.M. of the denominators, 3 and 4, is 12.

Multiplying both sides by 12, we obtain

$3(3t - 2) - 4(2t + 3) = 8 - 12t$

$\Rightarrow 9t - 6 - 8t - 12 = 8 - 12t$ (Opening the brackets)

$\Rightarrow 9t - 8t + 12t = 8 + 6 + 12$

$\Rightarrow 13t = 26$

$$\Rightarrow t = \frac{26}{13}$$
$$\Rightarrow t = 2$$

Q6 :

Solve the linear equation $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$

Answer :

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

L.C.M. of the denominators, 2 and 3, is 6.

Multiplying both sides by 6, we obtain

$6m - 3(m - 1) = 6 - 2(m - 2)$

$\Rightarrow 6m - 3m + 3 = 6 - 2m + 4$ (Opening the brackets)

$\Rightarrow 6m - 3m + 2m = 6 + 4 - 3$

$\Rightarrow 5m = 7$

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

Q7 :

Simplify and solve the linear equation $3(t-3)=5(2t+1)$

Answer :

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

$\Rightarrow 3t - 9 = 10t + 5$ (Opening the brackets)

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

$\Rightarrow - 14 = 7t$

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

$\Rightarrow t=-2$

Q8 :

Simplify and solve the linear equation $15(y-4)-2(y-9)+5(y+6)=0$

Answer :

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

$\Rightarrow 15y - 60 - 2y + 18 + 5y + 30 = 0$ (Opening the brackets)

$\Rightarrow 18y - 12 = 0$

$\Rightarrow 18y = 12$

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

Q9 :

Simplify and solve the linear equation $3(5z-7)-2(9z-11)=4(8z-13)-17$

Answer :

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

$\Rightarrow 15z - 21 - 18z + 22 = 32z - 52 - 17$ (Opening the brackets)

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

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

$\Rightarrow - 35z = - 70$

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

Q10 :

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

Answer :

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

$$\frac{1}{4}(4f-3)=\frac{1}{20}(10f-9)$$

Multiplying both sides by 20, we obtain

$5(4f - 3) = 10f - 9$

$\Rightarrow 20f - 15 = 10f - 9$ (Opening the brackets)

$\Rightarrow 20f - 10f = - 9 + 15$

$\Rightarrow 10f = 6$

$\Rightarrow f=\frac{3}{5}=0.6$

Exercise 2.6 : Solutions of Questions on Page Number : 35

Q1 :

Solve: $\frac{8x-3}{3x}=2$

Answer :

$$\frac{8x-3}{3x}=2$$

On multiplying both sides by $3x$, we obtain

$8x - 3 = 6x$

$\Rightarrow 8x - 6x = 3$

$\Rightarrow 2x = 3$

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

Q2 :

Solve: $\frac{9x}{7-6x} = 15$

Answer :

$\frac{9x}{7-6x} = 15$

Onmultiplying both sides by 7 - 6x, we obtain

$9x = 15(7 - 6x)$

$\Rightarrow 9x = 105 - 90x$

$\Rightarrow 9x + 90x = 105$

$\Rightarrow 99x = 105$

$\Rightarrow x = \frac{105}{99} = \frac{35}{33}$

Q3 :

Solve: $\frac{z}{z+15} = \frac{4}{9}$

Answer :

$\frac{z}{z+15} = \frac{4}{9}$

On multiplying both sides by $9(z + 15)$, we obtain

$9z = 4(z + 15)$

$\Rightarrow 9z = 4z + 60$

$\Rightarrow 9z - 4z = 60$

$\Rightarrow 5z = 60$

$\Rightarrow z = 12$

Q4 :

Solve: $\frac{3y+4}{2-6y} = \frac{-2}{5}$

Answer :

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

On multiplying both sides by $5(2 - 6y)$, we obtain

$5(3y + 4) = - 2(2 - 6y)$

$\Rightarrow 15y + 20 = - 4 + 12y$

$\Rightarrow 15y - 12y = - 4 - 20$

$\Rightarrow 3y = - 24$

$\Rightarrow y = - 8$

Q5 :

Solve: $\frac{7y+4}{y+2} = \frac{-4}{3}$

Answer :

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

On multiplying both sides by $3(y + 2)$, we obtain

$3(7y + 4) = - 4(y + 2)$

$\Rightarrow 21y + 12 = - 4y - 8$

$\Rightarrow 21y + 4y = - 8 - 12$

$\Rightarrow 25y = - 20$

$\Rightarrow y=-\frac{4}{5}$

Q6 :

The ages of Hari and Harry are in the ratio 5:7. Four years from now the ratio of their ages will be 3:4. Find their present ages.

Answer :

Let the common ratio between their ages be x. Therefore, Hari's age and Harry's age will be $5x$ years and $7x$ years respectively and four years later, their ages will be $(5x + 4)$ years and $(7x + 4)$ years respectively.

According to the situation given in the question,

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

$$\Rightarrow 4(5x+4)=3(7x+4)$$
$$\Rightarrow 20x+16=21x+12$$
$$\Rightarrow 16-12=21x-20x$$
$$\Rightarrow 4=x$$

Hari's age = 5x years = (5 × 4) years = 20 years

Harry's age = 7x years = (7 × 4) years = 28 years

Therefore, Hari's age and Harry's age are 20 years and 28 years respectively.

Q7 :

The denominator of a rational number is greater than its numerator by 8. If the numerator is increased by 17 and the denominator is decreased by 1, the number obtained is $\frac{3}{2}$. Find the rational number.

Answer :

Let the numerator of the rational number be x. Therefore, its denominator will be $x + 8$.

The rational number will be $\frac{x}{x+8}$. According to the question,

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

$\Rightarrow 2(x + 17) = 3(x + 7)$

$\Rightarrow 2x + 34 = 3x + 21$

$\Rightarrow 34 - 21 = 3x - 2x$

$\Rightarrow 13 = x$

Numerator of the rational number = $x = 13$

Denominator of the rational number = $x + 8 = 13 + 8 = 21$

Rational number $= \frac{13}{21}$