

NCERT SOLUTIONS CLASS-8 MATHS

CHAPTER-2 EXERCISE-2.1

Question-1

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

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

$$30x - 12 = 20x + 15 \text{ (opening the brackets)}$$

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

$$10x = 27$$

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

Question-2

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

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

$$7n = 252$$

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

$$n = 36$$

Question-3

Solve the linear equation

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

Answer-

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

LCM of the denominators 2, 3, and 6 is 6.

Multiplying both sides by 6, we obtain

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

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

$$5x = -25$$

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

$$x = -5$$

Question-4

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

Answer-

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

LCM of the denominators , 3 and 5 is 15.

Multiplying both the sides by 15, we obtain

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

$$5x-25= 3x-9 \text{ (opening the brackets)}$$

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

$$2x = 16$$

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

$$x=8$$

Question- 5

Solve the linear equation

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

Answer-

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

LCM of the denominators 3 and 4 is 12.

Multiplying both the sides by 12, we obtain

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

$$9t-6-8t-12= 8-12t \text{ (opening the brackets)}$$

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

$$12t= 26$$

$$t=2$$

Question-6

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

Answer-

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

LCM of the denominators, 2 and 3, is 6.

Multiplying both the sides by 6, we obtain

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

$$6m - 3m + 3 = 6 - 2m + 4 \text{ (opening the brackets)}$$

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

$$5m = 7$$

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

Question-7

Simplify and solve the linear equation

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

Answer-

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

$$3t - 9 = 10t + 5 \text{ (opening the brackets)}$$

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

$$-14 = 7t$$

$$t = -2$$

Question-8

Simplify and solve the linear equation

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

Answer-

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

$$15y - 60 - 2y + 18 + 5y + 30 = 0 \text{ (opening the brackets)}$$

$$18y - 12 = 0$$

$$18y = 12$$

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

Question-9**Simplify and solve the linear equation**

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

Answer-

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

$$15z-21-18z+22 = 32z-52-17 \text{ (opening the bracket)}$$

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

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

$$-35z = -70$$

$$z = 2$$

Question-10**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 the sides by 20, we obtain

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

$$20f-15 = 10f-9 \text{ (opening the brackets)}$$

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

$$10f = 6$$

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

Question-11

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

Answer-

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

On multiplying both sides by 3x, we obtain

$$8x-3 = 6x$$

$$8x-6x = 3$$

$$2x = 3$$

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

Question – 12

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

Answer:

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

On multiplying both the sides by 7-6x, we obtain

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

$$9x = 105 - 90x$$

$$9x + 90x = 105$$

$$99x = 105$$

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

Question-13

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

Answer-

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

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

$$9z = 4(z+15)$$

$$9z = 4z + 60$$

$$9z - 4z = 60$$

$$5z = 60$$

$$z = 12$$

Question-14

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

Answer-

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

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

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

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

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

.....

$$3y = -24$$

$$y = -8$$

Question-15

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

Answer-

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

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

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

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

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

$$25y = -20$$

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

Question-16

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 ages and Harry's ages 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,

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

$$4(5x+4) = 3(7x+4)$$

$$20x+16 = 21x+12$$

$$16-12 = 21x-20x$$

$$x = 4$$

$$\text{Hari's age} = 5x \text{ years} = (5 \times 4) \text{ years} = 20 \text{ years}$$

$$\text{Harry's age} = 7x \text{ years} = (7 \times 4) \text{ years} = 28 \text{ years}$$

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

Question-17

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,

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

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

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

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

$$x=13$$

Numerator of the rational number = $x=13$

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

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

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