Mathematics

(Chapter – 2) (Linear Equations in One Variable)

(Class – VIII)

Exercise 2.1

Question 1:

Solve the following: $x-2=7$

Answer 1:

$x-2=7$

$\Rightarrow \quad x-2+2 = 7+2$ [Adding 2 both sides]

$\Rightarrow \quad x = 9$

Question 2:

Solve the following: $y+3=10$

Answer 2:

$y+3=10$

$\Rightarrow \quad y+3-3 = 10-3$ [Subtracting 3 both sides]

$\Rightarrow \quad y = 7$

Question 3:

Solve the following: $6=z+2$

Answer 3:

$6=z+2$

$\Rightarrow \quad 6-2=z+2-2$ [Subtracting 2 both sides]

$\Rightarrow \quad 4=z \quad \Rightarrow \quad z=4$

Question 4:

Solve the following: $\frac{3}{7}+x=\frac{17}{7}$

Answer 4:

$\frac{3}{7}+x=\frac{17}{7}$

$\Rightarrow \quad x+\frac{3}{7}-\frac{3}{7}=\frac{17}{7}-\frac{3}{7}$ [Subtracting $\frac{3}{7}$ both sides]

$\Rightarrow \quad x=\frac{17-3}{7}$

$\Rightarrow \quad x=\frac{14}{7} \quad \Rightarrow \quad x=2$

Question 5:

Solve the following: $6x=12$

Answer 5:

$6x=12$

$\Rightarrow \quad \frac{x}{6}=\frac{12}{6}$ [Dividing both sides by 6]

$\Rightarrow \quad x=2$

Question 6:

Solve the following: $\frac{t}{5}=10$

Answer 6:

$\frac{t}{5}=10$

$\Rightarrow \quad \frac{t}{5}\times 5 = 10 \text{ x } 5$ [Multiplying both sides by 5]

$\Rightarrow \quad t = 50$

Question 7:

Solve the following: $\frac{2x}{3}=18$

Answer 7:

$\frac{2x}{3}=18$

$\Rightarrow \quad \frac{2x}{3}\times 3=18\times 3$ [Multiplying both sides by 3]

$\Rightarrow \quad 2x=18\times 3$

$\Rightarrow \quad \frac{2x}{2}=\frac{18\times 3}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad x=27$

Question 8:

Solve the following: $1.6=\frac{y}{1.5}$

Answer 8:

$1.6=\frac{y}{1.5}$

$\Rightarrow \quad 1.6\times 1.5=\frac{y}{1.5}\times 1.5$ [Multiplying both sides by 1.5]

$\Rightarrow \quad 2.40=y \quad \Rightarrow \quad y=2.40$

Question 9:

Solve the following: $7x-9=16$

Answer 9:

$7x-9=16$

$\Rightarrow \quad 7x-9+9=16+9$ [Adding 9 both sides]

$\Rightarrow \quad 7x=25 \quad \Rightarrow \quad \frac{7x}{7}=\frac{25}{7}$ [Dividing both sides by 7]

$\Rightarrow \quad x=\frac{25}{7}$

Question 10:

Solve the following: $14y-8=13$

Answer 10:

$14y-8=13$

$\Rightarrow \quad 14y-8+8=13+8$ [Adding 8 both sides]

$\Rightarrow \quad 14y=21$

$\Rightarrow \quad \frac{14y}{14}=\frac{21}{14}$ [Dividing both sides by 14]

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

Question 11:

Solve the following: $17+6p=9$

Answer 11:

$17+6p=9$

$\Rightarrow \quad 17+6p-17=9-17$ [Subtracting 17 from both sides]

$\Rightarrow \quad 6p=-8$

$\Rightarrow \quad \frac{6p}{6}=\frac{-8}{6}$ [Dividing both sides by 6]

$\Rightarrow \quad p=\frac{-4}{3}$

Question 12:

Solve the following: $\frac{x}{3}+1=\frac{7}{15}$

Answer 12:

$\frac{x}{3}+1=\frac{7}{15}$

$\Rightarrow \quad \frac{x}{3}+1-1=\frac{7}{15}-1$ [Subtracting 1 from both sides]

$$\Rightarrow \quad \frac{x}{3} = \frac{7-15}{15}$$

$$\Rightarrow \quad \frac{x}{3} = \frac{-8}{15}$$

$$\Rightarrow \quad \frac{x}{3} \times 3 = \frac{-8}{15} \times 3 \qquad \text{[Multiplying both sides by 3]}$$

$$\Rightarrow \quad x = \frac{-8}{5}$$

Exercise 2.2

Question 1:

If you subtract $\frac{1}{2}$ from a number and multiply the result by $\frac{1}{2}$, you get $\frac{1}{8}$. What is the number?

Answer 1:

Let the number be x.

According to the question, $\frac{1}{2}\left(x-\frac{1}{2}\right)=\frac{1}{8}$

$\Rightarrow \quad 2\times\frac{1}{2}\left(x-\frac{1}{2}\right)=\frac{1}{8}\times 2$ [Multiplying both sides by 2]

$\Rightarrow \quad x-\frac{1}{2}=\frac{1}{4}$

$\Rightarrow \quad x-\frac{1}{2}+\frac{1}{2}=\frac{1}{4}+\frac{1}{2}$ [Adding both sides $\frac{1}{2}$]

$\Rightarrow \quad x=\frac{1+2}{4}$

$\Rightarrow \quad x=\frac{3}{4}$

Hence, the required number is $\frac{3}{4}$.

Question 2:

The perimeter of a rectangular swimming pool is 154 m. Its length is 2 m more than twice its breadth. What are the length and breadth?

Answer 2:

Let the breadth of the pool be x m.

Then, the length of the pool = $(2x+2)$ m

Perimeter = $2(l+b)$

$\Rightarrow \quad 154 = 2(2x+2+x)$

$\Rightarrow \quad \frac{154}{2} = \frac{2(2x+2+x)}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad 77 = 3x+2$

$\Rightarrow \quad 77-2 = 3x+2-2$ [Subtracting 2 from both sides]

$\Rightarrow \quad 75 = 3x$

$\Rightarrow \quad \frac{75}{3} = \frac{3x}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad 25 = x$

$\Rightarrow \quad x = 25 \text{ m}$

Length of the pool = $2x+2 =$ 2 x 25 + 2 = 50 + 2 = 52 m

Breadth of the pool = 25 m

Hence, the length of the pool is 52 m and breadth is 25 m.

Question 3:

The base of an isosceles triangle is $\frac{4}{3}$ cm. The perimeter of the triangle is $4\frac{2}{15}$ cm. What is the length of either of the remaining equal sides?

Answer 3:

Let each of equal sides of an isosceles triangle be x cm.

Perimeter of a triangle = Sum of all three sides

$\Rightarrow \quad 4\frac{2}{15} = \frac{4}{3}+x+x$

$\Rightarrow \quad \frac{62}{15} = \frac{4}{3}+2x$

$\Rightarrow \quad \frac{62}{15}-\frac{4}{3} = \frac{4}{3}-\frac{4}{3}+2x$ [Subtracting $\frac{4}{3}$ from both the sides]

$\Rightarrow \quad \frac{62-20}{15} = 2x$

$\Rightarrow \quad \frac{42}{15} = 2x$

$\Rightarrow \quad \frac{42}{15\times 2} = \frac{2x}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad \frac{7}{5} = x$

$\Rightarrow \quad x = 1\frac{2}{5}$ cm

Hence, each equal side of an isosceles triangle is $1\frac{2}{5}$ cm.

Question 4:

Sum of two numbers is 95. If one exceeds the other by 15, find the numbers.

Answer 4:

Sum of two number = 95

Let the first number be x, then another number be $x+15$.

According to the question,

$x + x + 15 = 95$

$\Rightarrow \quad 2x + 15 = 95$

$\Rightarrow \quad 2x + 15 - 15 = 95 - 15$ [Subtracting 15 from both sides]

$\Rightarrow \quad 2x = 80$

$\Rightarrow \quad \frac{2x}{2} = \frac{80}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad x = 40$

So, the first number = 40 and another number = 40 + 15 = 55

Hence, the two numbers are 40 and 55.

Question 5:

Two numbers are in the ratio 5:3. If they differ by 18, what are the numbers?

Answer 5:

Let the two numbers be $5x$ and $3x$.

According to question,

$5x - 3x = 18$

$\Rightarrow \quad 2x = 18$

$\Rightarrow \quad \frac{2x}{2} = \frac{18}{2}$ [Dividing both sides by 2]

$\Rightarrow \quad x = 9$

Hence, first number = 5 x 9 = 45 and second number = 3 x 9 = 27.

Question 6:

Three consecutive integers add up to 51. What are these integers?

Answer 6:

Let the three consecutive integers be $x, x+1$ and $x+2$.

According to the question,

$x+x+1+x+2=51$

$\Rightarrow \quad 3x+3=51$

$\Rightarrow \quad 3x+3-3=51-3$ [Subtracting 3 from both sides]

$\Rightarrow \quad 3x=48$

$\Rightarrow \quad \frac{3x}{3}=\frac{48}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad x=16$

Hence, first integer = 16, second integer = 16 + 1 = 17 and third integer = 16 + 2 = 18.

Question 7:

The sum of three consecutive multiples of 8 is 888. Find the multiples.

Answer 7:

Let the three consecutive multiples of 8 be $x, x+8$ and $x+16$.

According to question, $x+x+8+x+16=888$

$\Rightarrow \quad 3x+24=888$

$\Rightarrow \quad 3x+24-24=888-24$ [Subtracting 24 from both sides]

$\Rightarrow \quad 3x=864$

$\Rightarrow \quad \frac{3x}{3}=\frac{864}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad x=288$

Hence, first multiple of 8 = 288, second multiple of 8 = 288 + 8 = 296 and third multiple of 8 = 288 + 16 = 304.

Question 8:

Three consecutive integers are such that when they are taken in increasing order and multiplied by 2, 3 and 4 respectively, they add up to 74. Find these numbers.

Answer 8:

Let the three consecutive integers be $x, x+1$ and $x+2$.

According to the question, $2x+3(x+1)+4(x+2)=74$

$\Rightarrow \quad 2x+3x+3+4x+8=74$

$\Rightarrow \quad 9x+11=74$

$\Rightarrow \quad 9x+11-11=74-11$ [Subtracting 11 from both sides]

$\Rightarrow \quad 9x=63$

$\Rightarrow \quad \frac{9x}{9}=\frac{63}{9}$ [Dividing both sides by 9]

$\Rightarrow \quad x=7$

Hence first integer = 7, second integer = 7 + 1 = 8 and third integer = 7 + 2 = 9.

Question 9:

The ages of Rahul and Haroon are in the ratio 5:7. Four years later the sum of their ages will be 56 years. What are their present ages?

Answer 9:

Let the present ages of Rahul and Haroon be $5x$ years and $7x$ years respectively.

According to condition, $(5x+4)+(7x+4)=56$

$\Rightarrow \quad 12x+8=56$

$\Rightarrow \quad 12x+8-8=56-8$ [Subtracting 8 from both sides]

$\Rightarrow \quad 12x=48$

$\Rightarrow \quad \frac{12x}{12}=\frac{48}{12}$ [Dividing both sides by 12]

$\Rightarrow \quad x=4$

Hence, present age of Rahul = 5 x 4 = 20 years and present age of Haroon = 7 x 4 = 28 years.

Question 10:

The number of boys and girls in a class are in the ratio 7 : 5. The number of boys is 8 more than the number of girls. What is the total class strength?

Answer 10:

Let the number of girls be x.

Then, the number of boys = $x+8$.

According to the question, $\frac{x+8}{x}=\frac{7}{5}$

$\Rightarrow \quad 5(x+8)=7x$

$\Rightarrow \quad 5x+40=7x$

$\Rightarrow \quad 5x-7x=-40$ [Transposing $7x$ to L.H.S. and 40 to R.H.S.]

$\Rightarrow \quad -2x=-40$

$\Rightarrow \quad \frac{-2x}{-2}=\frac{-40}{-2}$ [Dividing both sides by -2]

$\Rightarrow \quad x=20$

Hence the number of girls = 20 and number of boys = 20 + 8 = 28.

Question 11:

Baichung's father is 26 years younger than Baichung's grandfather and 29 years older than Baichung. The sum of the ages of all the three is 135 years. What is the age of each one of them?

Answer 11:

Let Baichung's age be x years, then Baichung's father's age = $(x+29)$ years and Baichung's granddaughter's age = $(x+29+26)=(x+55)$ years.

According to condition, $x+x+29+x+55=135$

$\Rightarrow \quad 3x+84=135$

$\Rightarrow \quad 3x+84-84=135-84$ [Subtracting 84 from both sides]

$\Rightarrow \quad 3x=51$

$\Rightarrow \quad \frac{3x}{3}=\frac{51}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad x=17$ years

Hence, Baichung's age = 17 years, Baichung's father's age = 17 + 29 = 46 years and Baichung's granddaughter's age = 17 + 29 + 26 = 72 years.

Question 12:

Fifteen years from now Ravi's age will be four times his present age. What is Ravi's present age?

Answer 12:

Let Ravi's present age be x years.

After fifteen years, Ravi's age = $4x$ years.

Fifteen years from now, Ravi's age = $(x+15)$ years.

According to question, $4x = x+15$

$\Rightarrow \quad 4x - x = 15$ [Transposing x to L.H.S.]

$\Rightarrow \quad 3x = 15$

$\Rightarrow \quad \frac{3x}{3} = \frac{15}{3}$ [Dividing both sides by 3]

$\Rightarrow \quad x = 5$ years

Hence, Ravi's present age be 5 years.

Question 13:

A rational number is such that when you multiply it by $\frac{5}{2}$ and add $\frac{2}{3}$ to the product, you get $\frac{-7}{12}$. What is the number?

Answer 13:

Let the rational number be x.

According to the question, $\frac{5}{2}x + \frac{2}{3} = \frac{-7}{12}$

$\Rightarrow \quad \frac{5}{2}x + \frac{2}{3} - \frac{2}{3} = \frac{-7}{12} - \frac{2}{3}$ [Subtracting $\frac{2}{3}$ from both sides]

$\Rightarrow \quad \frac{5x}{2} = \frac{-7-8}{12}$

$\Rightarrow \quad \frac{5x}{2} = \frac{-15}{12}$

$\Rightarrow \quad 5x \times 12 = -15 \times 2$

$\Rightarrow \quad 60x = -30$

$\Rightarrow \quad \frac{60x}{60} = \frac{-30}{60}$ [Dividing both sides by 60]

$\Rightarrow \quad x = \frac{-1}{2}$

Hence, the rational number is $\frac{-1}{2}$.

Question 14:

Lakshmi is a cashier in a bank. She has currency notes of denominations ₹100, ₹50 and ₹10 respectively. The ratio of the number of these notes is 2:3:5. The total cash with Lakshmi is ₹4,00,000. How many notes of each denomination does she have?

Answer 14:

Let number of notes be $2x, 3x$ and $5x$.

According to question, $100 \times 2x + 50 \times 3x + 10 \times 5x = 4,00,000$

$\Rightarrow \quad 200x + 150x + 50x = 4,00,000$

$\Rightarrow \quad 400x = 4,00,000$

$\Rightarrow \quad \frac{400x}{400} = \frac{4,00,000}{400}$ [Dividing both sides by 400]

$\Rightarrow \quad x = 1000$

Hence, number of denominations of ₹100 notes = 2 x 1000 = 2000

Number of denominations of ₹50 notes = 3 x 1000 = 3000

Number of denominations of ₹10 notes = 5 x 1000 = 5000

Therefore, required denominations of notes of ₹100, ₹50 and ₹10 are 2000, 3000 and 5000 respectively.

Question 15:

I have a total of ₹300 in coins of denomination ₹1, ₹2 and ₹5. The number of ₹2 coins is 3 times the number of ₹5 coins. The total number of coins is 160. How many coins of each denomination are with me?

Answer 15:

Total sum of money = ₹300

Let the number of ₹5 coins be x, number of ₹2 coins be $3x$ and number of ₹1 coins be $160 - (x + 3x) = 160 - 4x$.

According to question, $5\times x+2\times(3x)+1\times(160-4x)=300$

$\Rightarrow \quad 5x+6x+160-4x=300$

$\Rightarrow \quad 7x+160=300$

$\Rightarrow \quad 7x+160-160=300-160$ [Subtracting 160 from both sides]

$\Rightarrow \quad 7x=140$

$\Rightarrow \quad \frac{7x}{7}=\frac{140}{7}$ [Dividing both sides by 7]

$\Rightarrow \quad x=20$

Hence, the number of coins of ₹5 denomination = 20

Number of coins of ₹2 denomination = 3 x 20 = 60

Number of coins of ₹1 denomination = 160 – 4 x 20 = 160 – 80 = 80

Question 16:

The organizers of an essay competition decide that a winner in the competition gets a prize of ₹100 and a participant who does not win, gets a prize of ₹25. The total prize money distributed is ₹3,000. Find the number of participants is 63.

Answer 16:

Total sum of money = ₹3000

Let the number of winners of ₹100 be x.

And those who are not winners = $63-x$

According to the question, $100\times x+25\times(63-x)=3000$

$\Rightarrow \quad 100x+1575-25x=3000$

$\Rightarrow \quad 75x+1575=3000$

$\Rightarrow \quad 7x+1575-1575=3000-1575$ [Subtracting 1575 from both sides]

$\Rightarrow \quad 7x=1425$

$\Rightarrow \quad \frac{7x}{7}=\frac{1425}{7}$ [Dividing both sides by 7]

$\Rightarrow \quad x=19$

Hence the number of winner is 19.

Exercise 2.3

Question 1:

Solve the following equations and check your results: $3x = 2x + 18$

Answer 1:

$3x = 2x + 18$

$\Rightarrow \quad 3x - 2x = 18$

$\Rightarrow \quad x = 18$

To check:

$3x = 2x + 18$

$\Rightarrow \quad 3 \times 18 = 2 \times 18 + 18$

$\Rightarrow \quad 54 = 36 + 18$

$\Rightarrow \quad 54 = 54$

$\Rightarrow \quad$ L.H.S. = R.H.S.

Hence, it is correct.

Question 2:

Solve the following equations and check your results: $5t - 3 = 3t - 5$

Answer 2:

$5t - 3 = 3t - 5$

$\Rightarrow \quad 5t - 3t = -5 + 3$

$\Rightarrow \quad 2t = -2$

$\Rightarrow \quad t = \frac{-2}{2} = -1$

To check:

$5t - 3 = 3t - 5$

$\Rightarrow \quad 5 \times (-1) - 3 = 3 \times (-1) - 5$

$\Rightarrow \quad -5 - 3 = -3 - 5$

$\Rightarrow \quad -8 = -8$

$\Rightarrow \quad$ L.H.S. = R.H.S.

Hence, it is correct.

Question 3:

Solve the following equations and check your results: $5x+9=5+3x$

Answer 3:

$5x+9=5+3x$

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

$\Rightarrow \quad 2x=-4$

$\Rightarrow \quad x=\frac{-4}{2}=-2$

To check:

$5x+9=5+3x$

$\Rightarrow \quad 5\times(-2)+9=5+3\times(-2)$

$\Rightarrow \quad -10+9=5-6$

$\Rightarrow \quad -1=-1$

$\Rightarrow \quad$ L.H.S. = R.H.S.

Hence, it is correct.

Question 4:

Solve the following equations and check your results: $4z+3=6+2z$

Answer 4:

$4z+3=6+2z$

$\Rightarrow \quad 4z-2z=6-3$

$\Rightarrow \quad 2z=3$

$\Rightarrow \quad z=\frac{3}{2}$

To check:

$4z+3=6+2z$

$\Rightarrow \quad 4\times\frac{3}{2}+3=6+2\times\frac{3}{2}$

$\Rightarrow \quad 2\times3+3=6+3$

$\Rightarrow \quad 6+3=9$

$\Rightarrow \quad 9=9$

$\Rightarrow \quad$ L.H.S. = R.H.S.

Hence, it is correct.

Question 5:

Solve the following equations and check your results: $2x-1=14-x$

Answer 5:

$2x-1=14-x$

$\Rightarrow \quad 2x+x=14+1$

$\Rightarrow \quad 3x=15$

$\Rightarrow \quad x=\frac{15}{3}=5$

To check:

$2x-1=14-x$

$\Rightarrow \quad 2\times5-1=14-5$

$\Rightarrow \quad 10-1=9$

$\Rightarrow \quad 9=9$

$\Rightarrow \quad$ L.H.S. = R.H.S.

Hence, it is correct.

Question 6:

Solve the following equations and check your results: $8x+4=3(x-1)+7$

Answer 6:

$8x+4=3(x-1)+7$

$\Rightarrow \quad 8x+4=3x-3+7$

$\Rightarrow \quad 8x-3x=-3+7-4$

$\Rightarrow \quad 5x=0$

$\Rightarrow \quad x=\frac{0}{5}=0$

To check:

$8x+4=3(x-1)+7$

$\Rightarrow \quad 8\times0+4=3(0-1)+7$

$\Rightarrow \quad 0+4=3\times(-1)+7$

$\Rightarrow \quad 4=-3+7$

$\Rightarrow \quad 4=4$

$\Rightarrow \quad$ L.H.S. = R.H.S.

Hence, it is correct.

Question 7:

Solve the following equations and check your results: $x=\frac{4}{5}(x+10)$

Answer 7:

$$x=\frac{4}{5}(x+10)$$
$$\Rightarrow \quad 5x=4(x+10)$$
$$\Rightarrow \quad 5x=4x+40$$
$$\Rightarrow \quad 5x-4x=40$$
$$\Rightarrow \quad x=40$$

To check:

$$x=\frac{4}{5}(x+10)$$
$$\Rightarrow \quad 40=\frac{4}{5}(40+10)$$
$$\Rightarrow \quad 40=\frac{4}{5}\times 50$$
$$\Rightarrow \quad 40=4\times 10$$
$$\Rightarrow \quad 40 = 40$$
$$\Rightarrow \quad \text{L.H.S. = R.H.S.}$$

Hence, it is correct.

Question 8:

Solve the following equations and check your results: $\frac{2x}{3}+1=\frac{7x}{15}+3$

Answer 8:

$$\frac{2x}{3}+1=\frac{7x}{15}+3$$
$$\Rightarrow \quad \frac{2x}{3}-\frac{7x}{15}=3-1$$
$$\Rightarrow \quad \frac{10x-7x}{15}=2$$
$$\Rightarrow \quad 3x=30$$

$$\Rightarrow \quad x = \frac{30}{3} = 10$$

To check:

$$\frac{2x}{3} + 1 = \frac{7x}{15} + 3$$

$$\Rightarrow \quad \frac{2\times 10}{3} + 1 = \frac{7\times 10}{15} + 3$$

$$\Rightarrow \quad \frac{20}{3} + 1 = \frac{14}{3} + 3$$

$$\Rightarrow \quad \frac{20+3}{3} = \frac{14+9}{3}$$

$$\Rightarrow \quad \frac{23}{3} = \frac{23}{3}$$

$$\Rightarrow \quad \text{L.H.S. = R.H.S.}$$

Hence, it is correct.

Question 9:

Solve the following equations and check your results: $2y + \frac{5}{3} = \frac{26}{3} - y$

Answer 9:

$$2y + \frac{5}{3} = \frac{26}{3} - y$$

$$\Rightarrow \quad 2y + y = \frac{26}{3} - \frac{5}{3}$$

$$\Rightarrow \quad 3y = \frac{26-5}{3}$$

$$\Rightarrow \quad 3y = \frac{21}{3}$$

$$\Rightarrow \quad y = \frac{21}{3\times 3} = \frac{7}{3}$$

To check:

$$2y + \frac{5}{3} = \frac{26}{3} - y$$

$$\Rightarrow \quad 2\times\frac{7}{3} + \frac{5}{3} = \frac{26}{3} - \frac{7}{3}$$

$$\Rightarrow \quad \frac{14}{3}+\frac{5}{3}=\frac{26}{3}-\frac{7}{3}$$

$$\Rightarrow \quad \frac{14+5}{3}=\frac{26-7}{3}$$

$$\Rightarrow \quad \frac{19}{3}=\frac{19}{3}$$

$$\Rightarrow \quad \text{L.H.S. = R.H.S.}$$

Hence, it is correct.

Question 10:

Solve the following equations and check your results: $3m=5m-\frac{8}{5}$

Answer 10:

$$3m=5m-\frac{8}{5}$$

$$\Rightarrow \quad 3m-5m=\frac{-8}{5}$$

$$\Rightarrow \quad -2m=\frac{-8}{5}$$

$$\Rightarrow \quad m=\frac{-8}{5\times(-2)}$$

$$\Rightarrow \quad m=\frac{4}{5}$$

To check:

$$3m=5m-\frac{8}{5}$$

$$\Rightarrow \quad 3\times\frac{4}{5}=5\times\frac{4}{5}-\frac{8}{5}$$

$$\Rightarrow \quad \frac{12}{5}=4-\frac{8}{5}$$

$$\Rightarrow \quad \frac{12}{5}=\frac{20-8}{5}$$

$$\Rightarrow \quad \frac{12}{5}=\frac{12}{5}$$

$$\Rightarrow \quad \text{L.H.S. = R.H.S.}$$

Hence, it is correct.

Exercise 2.4

Question 1:

Amina thinks of a number and subtracts $\frac{5}{2}$ from it. She multiplies the result by 8. The result now obtained is 3 times the same number she thought of. What is the number?

Answer 1:

Let Amina think a number x.

According to the question, $8\left(x-\frac{5}{2}\right)=3x$

$\Rightarrow \quad 8x-\frac{8\times 5}{2}=3x$

$\Rightarrow \quad 8x-4\times 5=3x$

$\Rightarrow \quad 8x-20=3x$

$\Rightarrow \quad 8x-3x=20$

$\Rightarrow \quad 5x=20$

$\Rightarrow \quad x=\frac{20}{5}=4$

Hence, the number is 4.

Question 2:

A positive number is 5 times another number. If 21 is added to both the numbers, then one of the new numbers becomes twice the other new number. What are the numbers?

Answer 2:

Let another number be x.

Then positive number = $5x$

According to the question, $5x+21=2(x+21)$

$\Rightarrow \quad 5x+21=2x+42$

$\Rightarrow \quad 5x-2x=42-21$

$\Rightarrow \quad 3x=21$

$\Rightarrow \quad x=\frac{21}{3}=7$

Hence another number = 7 and positive number = 5 x 7 =35

Question 3:

Sum of the digits of a two-digit number is 9. When we interchange the digits, it is found that the resulting new number is greater than the original number by 27. What is the two-digit number?

Answer 3:

Let the unit place digit of a two-digit number be x.

Therefore, the tens place digit = $9-x$

$\because$ 2-digit number = 10 x tens place digit + unit place digit

$\therefore$ Original number = $10(9-x)+x$

According to the question, New number = Original number + 27

$\Rightarrow 10x+(9-x)=10(9-x)+x+27$

$\Rightarrow 10+9-x=90-10x+x+27$

$\Rightarrow 9x+9=117-9x$

$\Rightarrow 9x+9x=117-9$

$\Rightarrow 18x=108$

$\Rightarrow x=\frac{108}{18}=6$

Hence, the 2-digit number = $10(9-x)+x$ = 10 (9 – 6) + 6 = 10 x 3 + 6 = 30 + 6 = 36

Question 4:

One of the two digits of a two-digit number is three times the other digit. If you interchange the digits of this two-digit number and add the resulting number to the original number, you get 88. What is the original number?

Answer 4:

Let the unit place digit of a two-digit number be x.

Therefore, the tens place digit = $3x$

$\because$ 2-digit number = 10 x tens place digit + unit place digit

$\therefore$ Original number = $10\times 3x+x=30x+x = 31x$

According to the question, New number + Original number = 88

$\Rightarrow 10x+3x+31x=88$

$\Rightarrow 44x=88$

$\Rightarrow x=\frac{88}{44}=2$

Hence, the 2-digit number = $31x=31\times 2=62$

Question 5:

Shobo's mother's present age is six times Shobo's present age. Shobo's age five years from now will be one third of his mother's present age. What are their present age?

Answer 5:

Let Shobo's present age be x years.

And Shobo's mother's present age = $6x$ years

According to the question, $x+5=\frac{1}{3}\times 6x$

$\Rightarrow \quad x+5=2x$

$\Rightarrow \quad 2x=x+5$

$\Rightarrow \quad 2x-x=5$

$\Rightarrow \quad x=5$ years.

Hence, Shobo's present age = 5 years and Shobo's mother's present age = 6 x 5 = 30 years

Question 6:

There is a narrow rectangular plot, reserved for a school, in Mahuli village. The length and breadth of the plot are in the ratio 11:4. At the rate ` 100 per meter it will cost the village panchayat ` 75,000 to fence the plot. What are the dimensions of the plot?

Answer 6:

Let the length and breadth of the rectangular plot be $11x$ and $4x$ respectively.

$\therefore \quad$ Perimeter of the plot = $\frac{\text{Total Cost}}{\text{Cost of 1 meter}} = \frac{75000}{100}$ = 750 m

We know that Perimeter of rectangle = 2 (length + breadth)

Therefore, according to the question, $750=2(11x+4x)$

$\Rightarrow \quad 750=2\times 15x$

$\Rightarrow \quad 750=30x$

$\Rightarrow \quad 30x=750$

$\Rightarrow \quad x=\frac{750}{30}=25$

Hence, length of rectangular plot = 11 x 25 = 275 m and breadth of rectangular plot = 4 x 25 = 100 m

Question 7:

Hasan buys two kinds of cloth materials for school uniforms, shirt material that costs him ₹50 per meter and trouser material that costs him ₹90 per meter. For every 2 meters of the trouser material he buys 3 meters of the shirt material. He sells the materials at 12% and 10% respectively. His total sale is ₹36,000. How much trouser material did he buy?

Answer 7:

Let ratio between shirt material and trouser material be $3x : 2x$.

The cost of shirt material = $50 \times 3x = 150x$

The selling price at 12% gain = $\frac{100 + \text{P\%}}{100} \times \text{C.P.} = \frac{100+12}{100} \times 150x$

$= \frac{112}{100} \times 150x = 168x$

The cost of trouser material = $90 \times 2x = 180x$

The selling price at 12% gain = $\frac{100 + \text{P\%}}{100} \times \text{C.P.} = \frac{100+10}{100} \times 180x$

$= \frac{110}{100} \times 180x = 198x$

According to the question, $168x + 198x = 36,600$

$\Rightarrow \quad 366x = 36600$

$\Rightarrow \quad x = \frac{36600}{366} = 100$ meters

Now, trouser material = $2x$ = 2 x 100 = 200 meters

Hence, Hasan bought 200 meters of the trouser material.

Question 8:

Half of a herd of deer are grazing in the field and three fourths of the remaining are playing nearby. The rest 9 are drinking water from the pond. Find the number of deer in the herd.

Answer 8:

Let the total number of deer in the herd be x.

According to question, $x = \frac{x}{2} + \frac{3}{4} \times \left(x - \frac{x}{2} \right) + 9$

$\Rightarrow \quad x = \frac{x}{2} + \frac{3}{4}\left(\frac{2x - x}{2} \right) + 9$

$$\Rightarrow \quad x=\frac{x}{2}+\frac{3}{4}\times\frac{x}{2}+9$$

$$\Rightarrow \quad x=\frac{x}{2}+\frac{3}{8}x+9$$

$$\Rightarrow \quad x-\frac{x}{2}-\frac{3x}{8}=9$$

$$\Rightarrow \quad \frac{8x-4x-3x}{8}=9$$

$$\Rightarrow \quad \frac{x}{8}=9$$

$$\Rightarrow \quad x=9\times 8=72$$

Hence, the total number of deer in the herd is 72.

Question 9:

A grandfather is ten times older than his granddaughter. He is also 54 years older than her. Find their present ages.

Answer 9:

Let present age of granddaughter be x years.

Therefore, Grandfather's age = $10x$ years

According to question, $10x=x+54$

$$\Rightarrow \quad 10x-x=54$$

$$\Rightarrow \quad 9x=54$$

$$\Rightarrow \quad x=\frac{54}{9}=6 \text{ years}$$

Hence, granddaughter's age = 6 years and grandfather's age = 10 x 6 = 60 years.

Question 10:

Aman's age is three times his son's age. Ten years ago he was five times his son's age. Find their present ages.

Answer 10:

Let the present age of Amon's son be x years.

Therefore, Aman's age = $3x$ years

According to question, $3x-10=5(x-10)$

$$\Rightarrow \quad 3x-10=5x-50$$

$$\Rightarrow \quad 3x-5x=-50+10$$

$\Rightarrow \quad -2x = -40$

$\Rightarrow \quad x = \frac{-40}{-2}$ = 20 years

Hence, Aman's son's age = 20 years and Aman's age = 3 x 2 = 60 years

Exercise 2.5

Question 1:

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

Answer 1:

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

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

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

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

$$\Rightarrow \quad x=\frac{9\times 6}{20}=\frac{27}{10}$$

To check:

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

$$\Rightarrow \quad \frac{27}{10\times 2}-\frac{1}{5}=\frac{27}{10\times 3}+\frac{1}{4}$$

$$\Rightarrow \quad \frac{27}{20}-\frac{1}{5}=\frac{9}{10}+\frac{1}{4}$$

$$\Rightarrow \quad \frac{27-4}{20}=\frac{18+5}{20}$$

$$\Rightarrow \quad \frac{23}{20}=\frac{23}{20}$$

$$\Rightarrow \quad \text{L.H.S. = R. H. S.}$$

Therefore, it is correct.

Question 2:

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

Answer 2:

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

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

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

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

$$\Rightarrow \quad n=36$$

To check:

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

$$\Rightarrow \quad \frac{36}{2}-\frac{3\times 36}{4}+\frac{5\times 36}{6}=21$$

$$\Rightarrow \quad 18-27+30=21$$

$$\Rightarrow \quad 21 = 21$$

$$\Rightarrow \quad \text{L.H.S. = R. H. S.}$$

Therefore, it is correct.

Question 3:

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

Answer 3:

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

$$\Rightarrow \quad \frac{x}{1}-\frac{8x}{3}+\frac{5x}{2}=\frac{17}{6}-\frac{7}{1}$$

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

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

$$\Rightarrow \quad x = \frac{-25 \times 6}{6 \times 5}$$

$$\Rightarrow \quad x = -5$$

To check:

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

$$\Rightarrow \quad -5 + 7 - \frac{8 \times (-5)}{3} = \frac{17}{6} - \frac{5 \times (-5)}{2}$$

$$\Rightarrow \quad 2 + \frac{40}{3} = \frac{17}{6} + \frac{25}{2}$$

$$\Rightarrow \quad \frac{6 + 40}{3} = \frac{17 + 75}{6}$$

$$\Rightarrow \quad \frac{46}{3} = \frac{92}{6}$$

$$\Rightarrow \quad \frac{46}{3} = \frac{46}{3}$$

$$\Rightarrow \quad \text{L.H.S. = R. H. S.}$$

Therefore, it is correct.

Question 4:

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

Answer 4:

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

$$\Rightarrow \quad 5 \times (x-5) = 3(x-3)$$

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

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

$$\Rightarrow \quad 2x = 16$$

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

To check:

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

$$\Rightarrow \quad \frac{8-5}{3}=\frac{8-3}{5}$$

$$\Rightarrow \quad \frac{3}{3}=\frac{5}{5}$$

$$\Rightarrow \quad 1 = 1$$

$$\Rightarrow \quad \text{L.H.S. = R. H. S.}$$

Therefore, it is correct.

Question 5:

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

Answer 5:

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

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

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

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

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

$$\Rightarrow \quad 3\times(13t-18)=2\times12$$

$$\Rightarrow \quad 39t-54=24$$

$$\Rightarrow \quad 39t=24+54$$

$$\Rightarrow \quad 39t=78$$

$$\Rightarrow \quad t=\frac{78}{39}=2$$

To check:

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

$$\Rightarrow \quad \frac{3\times2-2}{4}-\frac{2\times2+3}{3}=\frac{2}{3}-2$$

$$\Rightarrow \quad \frac{6-2}{4}-\frac{4+3}{3}=\frac{2-6}{3}$$

$$\Rightarrow \quad \frac{4}{4}-\frac{7}{3}=\frac{-4}{3}$$

$$\Rightarrow \quad \frac{1}{1}-\frac{7}{3}=\frac{-4}{3}$$

$$\Rightarrow \quad \frac{3-7}{3}=\frac{-4}{3}$$

$$\Rightarrow \quad \frac{-4}{3}=\frac{-4}{3}$$

$$\Rightarrow \quad \text{L.H.S. = R. H. S.}$$

Therefore, it is correct.

Question 6:

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

Answer 6:

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

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

$$\Rightarrow \quad \frac{6m-3(m-1)+2(m-2)}{6}=1$$

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

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

$$\Rightarrow \quad 5m-1=6$$

$$\Rightarrow \quad 5m=6+1$$

$$\Rightarrow \quad 5m=7$$

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

To check:

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

$$\Rightarrow \quad \frac{7}{5}-\frac{\frac{7}{5}-1}{2}=1-\frac{\frac{7}{5}-2}{3}$$

$$\Rightarrow \quad \frac{7}{5}-\frac{\frac{7-5}{5}}{2}=1-\frac{\frac{7-10}{5}}{3}$$

$$\Rightarrow \quad \frac{7}{5}-\frac{2}{5\times 2}=1-\frac{-3}{5\times 3}$$

$$\Rightarrow \quad \frac{7}{5}-\frac{1}{5}=1+\frac{1}{5}$$

$$\Rightarrow \quad \frac{7-1}{5}=\frac{5+1}{5}$$

$$\Rightarrow \quad \frac{6}{5}=\frac{6}{5}$$

$\Rightarrow$ L.H.S. = R. H. S.

Therefore, it is correct.

Question 7:

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

Answer 7:

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

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

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

$$\Rightarrow \quad -7t=14$$

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

$$\Rightarrow \quad t=-2$$

To check:

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

$$\Rightarrow \quad 3(-2-3)=5\{2\times(-2)+1\}$$

$$\Rightarrow \quad 3\times -5=5(-4+1)$$

$$\Rightarrow \quad -15=5\times(-3)$$

$$\Rightarrow \quad -15=-15$$

$\Rightarrow$ L.H.S. = R. H. S.

Therefore, it is correct.

Question 8:

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

Answer 8:

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

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

$$\Rightarrow \quad 18y-12=0$$

$$\Rightarrow \quad 18y=12$$

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

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

To check:

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

$$\Rightarrow \quad 15\left(\frac{2}{3}-4\right)-2\left(\frac{2}{3}-9\right)+5\left(\frac{2}{3}+6\right)=0$$

$$\Rightarrow \quad 15\left(\frac{2-12}{3}\right)-2\left(\frac{2-27}{3}\right)+5\left(\frac{2+18}{3}\right)=0$$

$$\Rightarrow \quad 15\times\frac{-10}{3}-2\times\frac{-25}{3}+5\times\frac{20}{3}=0$$

$$\Rightarrow \quad -50+\frac{50}{3}+\frac{100}{3}=0$$

$$\Rightarrow \quad -50+\frac{50+100}{3}=0$$

$$\Rightarrow \quad -50+\frac{150}{3}=0$$

$$\Rightarrow \quad -50+50=0$$

$$\Rightarrow \quad 0=0$$

$$\Rightarrow \quad \text{L.H.S.} = \text{R. H. S.}$$

Therefore, it is correct.

Question 9:

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

Answer 9:

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

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

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

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

$\Rightarrow \quad -35z=-70$

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

To check:

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

$\Rightarrow \quad 3(5\times 2-7)-2(9\times 2-11)=4(8\times 2-13)-17$

$\Rightarrow \quad 3(10-7)-2(18-11)=4(16-13)-17$

$\Rightarrow \quad 3\times 3-2\times 7=4\times 3-17$

$\Rightarrow \quad 9-14=12-17$

$\Rightarrow \quad -5=-5$

$\Rightarrow$ L.H.S. = R. H. S.

Therefore, it is correct.

Question 10:

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

Answer 10:

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

$\Rightarrow \quad 1.00f-0.75=0.50f-0.45$

$\Rightarrow \quad 1.00f-0.50f=-0.45+0.75$

$\Rightarrow \quad 0.50f=0.3$

$\Rightarrow \quad f=\frac{0.3}{0.50}$

$\Rightarrow \quad f=0.6$

To check:

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

$\Rightarrow \quad 0.25(4\times0.6-3)=0.05(10\times0.6-9)$

$\Rightarrow \quad 0.25(2.4-3)=0.05(6.0-9)$

$\Rightarrow \quad 0.25\times(-0.6)=0.05\times(-3)$

$\Rightarrow \quad -0.150=-0.150$

$\Rightarrow$ L.H.S. = R. H. S.

Therefore, it is correct.

Exercise 2.6

Question 1:

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

Answer 1:

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

$$\Rightarrow \quad 8x-3=2\times 3x$$

$$\Rightarrow \quad 8x-3=6x$$

$$\Rightarrow \quad 8x-6x=3$$

$$\Rightarrow \quad 2x=3$$

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

Question 2:

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

Answer 2:

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

$$\Rightarrow \quad 9x=15(7-6x)$$

$$\Rightarrow \quad 9x=105-90x$$

$$\Rightarrow \quad 9x+90x=105$$

$$\Rightarrow \quad 99x=105$$

$$\Rightarrow \quad x=\frac{105}{99}$$

$$\Rightarrow \quad x=\frac{35}{33}$$

Question 3:

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

Answer 3:

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

$$\Rightarrow \quad z \times 9 = 4(z+15)$$

$$\Rightarrow \quad 9z = 4z + 60$$

$$\Rightarrow \quad 9z - 4z = 60$$

$$\Rightarrow \quad 5z = 60$$

$$\Rightarrow \quad z = \frac{60}{5}$$

$$\Rightarrow \quad z = 12$$

Question 4:

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

Answer 4:

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

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

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

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

$$\Rightarrow \quad 3y = -24$$

$$\Rightarrow \quad y = \frac{-24}{3}$$

$$\Rightarrow \quad y = -8$$

Question 5:

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

Answer 5:

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

$$\Rightarrow \quad 3(7y+4)=-4(y+2)$$

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

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

$$\Rightarrow \quad 25y=-20$$

$$\Rightarrow \quad y=\frac{-20}{25}$$

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

Question 6:

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 6:

Let the Ages of Hari and Harry be $5x$ years and $7x$ years.

According to question, $\frac{5x+4}{7x+4}=\frac{3}{4}$

$$\Rightarrow \quad 4(5x+4)=3(7x+4)$$

$$\Rightarrow \quad 20x+16=21x+12$$

$$\Rightarrow \quad 20x-21x=12-16$$

$$\Rightarrow \quad -x=-4$$

$$\Rightarrow \quad x=4$$

Hence, the age of Hari = $5x$ = 5 x 4 = 20 years and the age of Harry = $7x$ = 7 x 4 = 28 years.

Question 7:

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 7:

Let the numerator of a rational number be x, then the denominator is $x+8$.

Therefore, Rational number = $\frac{x}{x+8}$

According to the question,

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

$$\Rightarrow \quad \frac{x+17}{x+7}=\frac{3}{2}$$

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

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

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

$$\Rightarrow \quad -x=-13$$

$$\Rightarrow \quad x=13$$

Hence, the required rational number = $\frac{x}{x+8}=\frac{13}{13+8}=\frac{13}{21}$.