Unit 4(Linear Equation In One Variable)

Multiple Choice Questions

Question. 1 The solution of which of the following equations is neither a fraction nor an integer?

(a) -3x + 2=5x + 2 (b)4x-18=2 (c)4x + 7 = x + 2 (d)5x-8 = x +4

Solution. For option (c)

Given linear equation is $\quad 3x + 2 = 5x + 2$

$\Rightarrow \qquad\qquad\qquad 3x - 5x = 2 - 2 \qquad$ [transposing $5x$ to LHS and 2 to RHS]

$\Rightarrow \qquad\qquad\qquad\qquad -2x = 0$

$\Rightarrow \qquad\qquad\qquad\qquad \dfrac{-2x}{-2} = \dfrac{0}{-2} \qquad$ [dividing both sides by -2]

$\therefore \qquad\qquad\qquad\qquad\quad x = 0$

Hence, $x = 0$ is an integer.

For option (b)

Given linsar equation is $\quad 4x - 18 = 2$

$\Rightarrow \qquad\qquad\qquad\qquad 4x = 2 + 18 \qquad$ [transposing -18 to RHS]

$\Rightarrow \qquad\qquad\qquad\qquad 4x = 20$

$\Rightarrow \qquad\qquad\qquad\qquad \dfrac{4x}{4} = \dfrac{20}{4} \qquad$ [dividing both sides by 4]

$\therefore \qquad\qquad\qquad\qquad\quad x = 5$

Hence, $x = 5$ is a positive integer.

For option (c)

Given linear equation is $\quad 4x + 7 = x + 2$

$\Rightarrow \qquad\qquad\qquad 4x - x = 2 - 7 \qquad$ [transposing x to LHS and 7 to RHS]

$\Rightarrow \qquad\qquad\qquad\qquad 3x = -5$

$\therefore \qquad\qquad\qquad\qquad\quad x = \dfrac{-5}{3} \qquad$ [dividing both sides by 3]

Hence, $x = \dfrac{-5}{3}$ is neither a fraction nor an integer.

For option (d)

Given linear equation is $5x - 8 = x + 4$

$\Rightarrow \qquad 5x - x = 4 + 8$ [transposing x to LHS and -8 to RHS]

$\Rightarrow \qquad 4x = 12$

$\Rightarrow \qquad \dfrac{4x}{4} = \dfrac{12}{4}$ [dividing both sides by 4]

$\therefore \qquad x = 3$

Hence, $x = 3$ is a positive integer.

From the above it is clear that, option (c) satisfies the condition.

Question. 2 The solution of the equation $ax + b = 0$ is

(a) $x = \dfrac{a}{b}$

(b) $x = -b$

(c) $x = \dfrac{-b}{a}$

(d) $x = \dfrac{b}{a}$

Solution.

(c) Given equation is $ax + b = 0$

$\Rightarrow \qquad ax = -b$ [transposing b to RHS]

$\Rightarrow \qquad \dfrac{ax}{a} = \dfrac{-b}{a}$ [dividing both sides by a]

$\therefore \qquad x = \dfrac{-b}{a}$

Hence, the solution of the equation $ax + b = 0$ is $x = -\dfrac{b}{a}$.

Question. 3 If $8x - 3 = 25 + 17x$, then x is

(a) a fraction (b) an integer

(c) a rational number (d) Cannot be solved

Solution. (c) Given, $8x - 3 = 25 + 17x$

$\Rightarrow \qquad 8x - 17x = 25 + 3$ [transposing $17x$ to LHS and -3 to RHS]

$\Rightarrow \qquad -9x = 28$

$\therefore \qquad x = \dfrac{-28}{9}$ [dividing both sides by -9]

Hence, x is a rational number.

Question. 4 The shifting of a number from one side of an equation to other is called

(a) transposition (b) distributivity

(c) commutativity (d) associativity .

Solution. (a) The shifting of a number from one side of an equation to other side is called transposition.

e.g. x +a = 0is the equation, x = -a

Here, number 'a' shifts from left hand side to right hand side.

Question. 5 If $\dfrac{5x}{3} - 4 = \dfrac{2x}{5}$, then the numerical value of $2x - 7$ is

(a) $\dfrac{19}{13}$ (b) $\dfrac{-13}{19}$

(c) 0 (d) $\dfrac{13}{19}$

Solution. (b)

Given,
$$\frac{5x}{3} - 4 = \frac{2x}{5}$$

$\Rightarrow \qquad \frac{5x}{3} - \frac{2x}{5} = 4 \qquad \left[\text{transposing } \frac{2x}{5} \text{ to LHS and } -4 \text{ to RHS}\right]$

$\Rightarrow \qquad \frac{25x - 6x}{15} = 4 \qquad \text{[taking LCM in LHS]}$

$\Rightarrow \qquad 19x = 60$

$\Rightarrow \qquad \frac{19x}{19} = \frac{60}{19} \qquad \text{[dividing both sides by 19]}$

$\therefore \qquad x = \frac{60}{19}$

Now, $\qquad 2x - 7 = 2 \times \frac{60}{19} - 7 \qquad \text{[putting the value of } x\text{]}$

$\qquad = \frac{120 - 133}{19} = -\frac{13}{19} \qquad \text{[taking LCM]}$

Hence, the numerical value of $2x - 7$ is $-\frac{13}{19}$.

Question. 6 The value of x, for which the expressions 3x − 4 and 2x + 1 become equal, is
(a) -3 (b) 0
(c) 5 x (d) 1
Solution. (c) Given expressions 3x − 4 and 2x + 1 are equal.
Then, 3x-4 = 2x + 1
3x- 2x = 1 + 4 [transposing 2x to LHS and -4 to RHS]
x = 5
Hence, the value of x is 5.

Question. 7 If a and b are positive integers, then the solution of the equation ax = b has to be always
(a) positive (b) negative (c) one (d) zero
Solution. (a) If ax = b, then x = $\frac{b}{a}$
Since, a and b are positive integers. So,$\frac{b}{a}$ is also positive integer, Hence, the solution of the given equation has to be always positive.

Question. 8 Linear equation in one variable has
(a) only one variable with any power
(b) only one term with a variable
(c) only one variable with power 1
(d) only constant term
Solution. (c) Linear equation in one variable has only one variable with power 1.
e.g. 3x + 1 = 0,2y − 3 = 7 and z + 9 = − 2 are the linear equations in one variable.

Question. 9 Which of the following is a linear expression?
(a) x^2 +1 (b) y + y^2
(c) 4 (d) 1 + z
Solution. (d) We know that, the algebraic expression in one variable having the highest power of the variable as 1, is known as the linear expression.
Here, 1 + z is the only linear expression, as the power of the variable z is 1.

Question.10 A linear equation in one variable has
(a) only one solution (b) two solutions
(c) more than two solutions (d) no solution
Solution. (a) A linear equation in one variable has only one solution.
e.g. Solution of the linear equation ax + b = 0 is unique, i.e. x = $\frac{-b}{a}$

Question. 11 The value of S in $\frac{1}{3}$ + S = $\frac{2}{5}$ is

(a)$\frac{4}{5}$ (b)$\frac{1}{15}$

(c)10 (d)0

Solution.(b) Given, $\frac{1}{3} + S = \frac{2}{5}$

$$\Rightarrow \qquad S = \frac{2}{5} - \frac{1}{3} \qquad\qquad \left[\text{transposing } \frac{1}{3} \text{ to RHS}\right]$$

$$\Rightarrow \qquad S = \frac{6-5}{15} \qquad\qquad [\text{taking LCM in RHS}]$$

$$\therefore \qquad S = \frac{1}{15}$$

Question.12 If $-\frac{4}{3}y = -\frac{3}{4}$ then y is equal to

(a)$-\left[\frac{3}{4}\right]^2$ (b)$-\left[\frac{4}{3}\right]^2$

(c)$\left[\frac{3}{4}\right]^2$ (d)$\left[\frac{4}{3}\right]^2$

Solution.

(c) Given, $\qquad\qquad -\frac{4}{3}y = \frac{-3}{4}$

$$\Rightarrow \qquad\qquad y = \frac{-3}{4} \times \frac{-3}{4} \qquad [\text{by cross-multiplication}]$$

$$\Rightarrow \qquad\qquad y = \left(\frac{3}{4}\right)^2$$

Hence, the value of y is $\left(\frac{3}{4}\right)^2$.

Question. 13 The digit in the ten's place of a two-digit number is 3 more than the digit in the unit's place. Let the digit at unit's place be b. Then, the number is

(a) 11b+30 (b) 10b+ 30

(c) 11 b + 3 (d) 10b + 3

Solution. (a) Let digit at unit's place be b.

Then, digit at ten's place = (3 + b)

Number = 10 (3 + b) + b − 30 + 10b + b = 11b + 30

Question. 14 Arpita's present age is thrice of Shilpa. If Shilpa's age three years ago was x, then Arpita's present age is

(a) 3 (x − 3) (b)3x + 3

(c) 3x − 9 (d) 3(x + 3)

Solution. (d) Given, Shilpa's age three years ago = x

Then, Shilpa's present age = (x + 3)

Arpita's present age = 3 x Shilpa's present age = 3 (x + 3)

Question. 15 The sum of three consecutive multiples of 7 is 357. Find the smallest multiple.(a) 112 (b) 126 (c) 119 (d) 116

Solution.

(a) Let the three consecutive multiples of 7 be $7x$, $(7x + 7)$, $(7x + 14)$ where x is a natural number.

According to the question,

$$7x + (7x + 7) + (7x + 14) = 357$$

$$\Rightarrow \qquad 21x + 21 = 357$$

$$\Rightarrow \qquad 21 (x + 1) = 357$$

$$\Rightarrow \qquad \frac{21 (x + 1)}{21} = \frac{357}{21} \qquad [\text{dividing both sides by 21}]$$

$$\Rightarrow \qquad x + 1 = 17$$

$$\Rightarrow \qquad x = 17 - 1 \qquad [\text{transposing 1 to RHS}]$$

$$\therefore \qquad x = 16$$

Hence, the smallest multiple of 7 is 7×16, i.e. 112.

Fill in the Blanks

In questions 16 to 32, fill in the blanks to make each statement true.

Question. 16 In a linear equation, the—— power of the variable appearing in the equation is one.

Solution. highest

e.g. x + 3 = O and x + 2 = 4 are the linear equations.

Question. 17 The solution of the equation 3x − 4 = 1 − 2x is————- .

Solution.

1

Given, $3x - 4 = 1 - 2x$

$\Rightarrow$ $3x + 2x = 1 + 4$ [transposing $-2x$ to LHS and -4 to RHS]

$\Rightarrow$ $5x = 5$

$\Rightarrow$ $\dfrac{5x}{5} = \dfrac{5}{5}$ [dividing both sides by 5]

$\therefore$ $x = 1$

Hence, the solution of the given equation is 1.

Question. 18 The solution of the equation $2y = 5y - \dfrac{18}{5}$ is————.

Solution.

$\dfrac{6}{5}$

Given, $2y = 5y - \dfrac{18}{5}$

$\Rightarrow$ $2y - 5y = \dfrac{-18}{5}$ [transposing $5y$ to LHS]

$\Rightarrow$ $-3y = -\dfrac{18}{5}$

$\Rightarrow$ $\dfrac{-3y}{-3} = \dfrac{-18}{-3 \times 5}$ [dividing both sides by -3]

$\therefore$ $y = \dfrac{6}{5}$

Hence, the solution of the given equation is $\dfrac{6}{5}$.

Question. 19 Any value of the variable, which makes both sides of an equation equal, is known as a————of the equation.

Solution. e.g. x + 2 = 3 => x = 3-2 = 1 [transposing 2 to RHS]

Hence, x = 1 satisfies the equation and it is a solution of the equation.

Question. 20 9x − ……………….. = − 21 has the solution (- 2).

Solution. 3

Let 9x-m= -21 has the solution (-2).

Since, $x = -2$ is the solution of the equation.

$\therefore$ $9 \times (-2) - m = -21$

$\Rightarrow$ $-18 - m = -21$ [transposing -21 to LHS and $-m$ to RHS]

$-18 + 21 = m$

$\Rightarrow$ $m = 3$

Hence, $9x - 3 = -21$ has the solution (-2).

Question. 21 Three consecutive numbers whose sum is 12 are———,—————-and———.

Solution.

3, 4, 5

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

According to the question,

$$x + x + 1 + x + 2 = 12$$
$$\Rightarrow \quad 3x + 3 = 12$$
$$\Rightarrow \quad 3(x + 1) = 12$$
$$\Rightarrow \quad \frac{3(x + 1)}{3} = \frac{12}{3} \qquad \text{[dividing both sides by 3]}$$
$$\Rightarrow \quad x + 1 = 4$$
$$\Rightarrow \quad x = 4 - 1 \qquad \text{[transposing 1 to RHS]}$$
$$\Rightarrow \quad x = 3$$

Hence, the consecutive numbers are 3, 3 + 1 and 3 + 2, i.e. 3, 4 and 5.

Question. 22 The share of A when Rs 25 are divided between A and B, so that A gets Rs 8 more than B, is———.

Solution.

₹ 16.5

Let, B's share be ₹ x. Then, A's share = ₹ $(x + 8)$

According to the question,

$$x + x + 8 = 25$$
$$\Rightarrow \quad 2x + 8 = 25$$
$$\Rightarrow \quad 2x = 25 - 8 \qquad \text{[transposing 8 to RHS]}$$
$$\Rightarrow \quad 2x = 17$$
$$\Rightarrow \quad \frac{2x}{2} = \frac{17}{2} \qquad \text{[dividing both sides by 2]}$$
$$\Rightarrow \quad x = 8.5$$

Hence, A's share = 8.5 + 8 = ₹ 16.5

Question. 23 A term of an equation can be transposed to the other side by changing its—-.

Solution. sign

e.g. x + a = 0 is a linear equation. .

=> x = -a

Hence, the term of an equation can be transposed to the other side by changing its sign.

Question. 24 On subtracting 8 from x, the result is 2. The value of x is———.

Solution.

10

Given, $\qquad x - 8 = 2$
$$\Rightarrow \quad x = 8 + 2 \qquad \text{[transposing -8 to RHS]}$$
$$\therefore \quad x = 10$$

Hence, the value of x is 10.

Question. 25 $\frac{x}{5} + 30 = 18$ has the solution as———.

Solution.

– 60

Given, $\qquad \frac{x}{5} + 30 = 18$
$$\Rightarrow \quad \frac{x}{5} = 18 - 30 \qquad \text{[transposing 30 to RHS]}$$
$$\Rightarrow \quad \frac{x}{5} = -12$$
$$\frac{x}{5} \times 5 = -12 \times 5 \qquad \text{[multiplying both sides by 5]}$$
$$\Rightarrow \quad x = -60$$

Hence, the solution is –60.

Question. 26 When a number is divided by 8, the result is -3. The number is———.

Solution.

–24

Let the number be x.

According to the question,

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

$$\Rightarrow \qquad x = 8 \times (-3)$$

$$\Rightarrow \qquad x = -24 \qquad \text{[by cross-multiplication]}$$

Hence, the required number is –24.

Question. 27 When 9 is subtracted from the product of p and 4, the result is 11. The value of p is—-.

Solution.

5

Given, 9 is subtracted from the product of p and 4.

Then, $\qquad\qquad 4p - 9 = 11$

$$\Rightarrow \qquad\qquad 4p = 11 + 9 \qquad \text{[transposing –9 to RHS]}$$

$$\Rightarrow \qquad\qquad 4p = 20$$

$$\Rightarrow \qquad\qquad \frac{4p}{4} = \frac{20}{4} \qquad \text{[dividing both sides by 4]}$$

$$\therefore \qquad\qquad p = 5$$

Hence, the value of p is 5.

Question. 28 If $\frac{2}{5}$ x-2=5-$\frac{3}{5}$ x, then x=——-.

Solution.

7

Given, $\qquad\qquad \frac{2}{5}x - 2 = 5 - \frac{3}{5}x$

$$\Rightarrow \qquad \frac{2x}{5} + \frac{3x}{5} = 5 + 2 \left[\text{transposing } -\frac{3x}{5} \text{ to LHS and } -2 \text{ to RHS}\right]$$

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

$$\Rightarrow \qquad\qquad x = 7$$

Hence, the value of x is 7.

Question. 29 After 18 years, Swarnim will be 4 times as old as he is now. His present age is ———.

Solution.

6 years

Let Swarnim's present age be x yr.

After 18 yr, Swarnim's age = $(x + 18)$ yr

According to the question,

$$x + 18 = 4x$$

$$\Rightarrow \qquad x - 4x = -18 \qquad \text{[transposing 4x to LHS and 18 to RHS]}$$

$$\Rightarrow \qquad -3x = -18$$

$$\Rightarrow \qquad \frac{-3x}{-3} = \frac{-18}{3} \qquad \text{[dividing both sides by –3]}$$

$$\therefore \qquad x = 6$$

Hence, Swarnim's present age is 6 yr.

Question. 30 Convert the statement 'adding 15 to 4 times x is 39' into an equation.

Solution. 4x+ 15=39

To convert the given statement into an equation, first x is multiplied by 4 and then 15 is added to get the result 39. i.e. 4x + 15=39

Question. 31 The denominator of a rational number is greater than the numerator by 10. If the numerator is increased by 1 and the denominator is decreased by 1, then expression for new denominator is——.

Solution.

x + 9

Let numerator be x. Then, denominator = $x + 10$

$\therefore$ Rational number = $\dfrac{x}{x + 10}$

According to the question,

New rational number = $\dfrac{\text{Numerator} + 1}{\text{Denominator} - 1} = \dfrac{x + 1}{x + 10 - 1} = \dfrac{x + 1}{x + 9}$

Hence, the new denominator is $x + 9$.

Question. 32 The sum of two consecutive multiples of 10 is 210. The smaller multiple is——-.

Solution.

100

Let the two consecutive multiples of 10 be $10x$ and $10x + 10$.

According to the question,

$$10x + 10x + 10 = 210$$
$$\Rightarrow \qquad 20x + 10 = 210$$
$$\Rightarrow \qquad 20x = 210 - 10 \qquad \text{[transposing 10 to RHS]}$$
$$\Rightarrow \qquad 20x = 200$$
$$\Rightarrow \qquad \dfrac{20x}{20} = \dfrac{200}{20} \qquad \text{[dividing both sides by 20]}$$
$$\therefore \qquad x = 10$$

Hence, the smaller multiple is 10×10, i.e. 100.

True/False

In questions 33 to 48, state whether the statements are True or False.

Question. 33 3 years ago, the age of boy was y years. His age 2 years ago was $(y - 2)$ years.

Solution. False

Given, 3 yr ago, age of boy = y yr

Then, present age of boy = (y + 3)yr

2 yr ago, age of boy = y + 3-2 = (y + 1)yr

Question. 34 Shikha's present age is p years. Reemu's present age is 4 times the present age of Shikha. After 5 years, Reemu's age will be 15p years.

Solution. False

Given, Shikha's present age = pyr

Then, Reemu's present age = 4 x (Shikha's present age) = 4pyr After 5 yr, Reemu's age = (4p+5)yr

Question. 35 In a 2-digit number, the unit's place digit is x. If the sum of digits be 9, then the number is $(10x - 9)$.

Solution. False

Given, unit's digit = x

and sum of digits = 9

Ten's digit = 9 − x

Hence, the number = 10 (9 -x)+x = 90 -10x + x = 90 − 9x

Question. 36 Sum of the ages of Anju and her mother is 65 years. If Anju's present age is y years, then her mother's age before 5 years is $(60 - y)$ years.

Solution. True

Given, Anju's present age = y yr

Then, Anju's mother age = (65 − y)yr

Before 5 yr, Anju's mother age = 65 − y − 5 = (60 − y)yr

Question. 37 The number of boys and girls in a class are in the ratio 5 : 4. If the number of boys is 9 more than the number of girls, then number of boys is 9.

Solution. False

Let the number of boys be 5x and the number of girls be 4x.

According to the question, − 5x − 4x = 9 => x = 9

Hence, number of boys = 5 x 9 = 45

Question. 38 A and B are together 90 years old. Five years ago, A was thrice as old as B was. Hence, the ages of A and B five years back would be (x − 5) years and (85 − x) years, respectively.

Solution. True

Let the age of A be x yr.

Then, age of S = (90 − x) yr

Five years ago, the age of A = (x- 5) yr

The age of B= 90-x-5 = (85-x)yr

Hence, the ages of A and 8 five years back would be (x − 5) yr and (85 − x) yr, respectively.

Question. 39 Two different equations can never have the same answer.

Solution. False

Two different equations may have the same answer.

e.g.2x + 1 = 2 and 2x − 5 = − 4 are the two linear equations whose solution is $\frac{1}{2}$

Question. 40 In the equation 3x − 3 = 9, transposing − 3 to RHS, we get 3x = 9.

Solution. False

Given, 3x − 3 = 9

=> 3x = 9 + 3 [transposing -3 to RHS]

=> 3x = 12

Question. 41 In the equation 2x = 4 − x, transposing − x to LHS, we get x = 4.

Solution. False

Given, 2x = 4-x

=> 2x + x = 4 [transposing -x to LHS]

=> 3x = 4

Question. 42

If $\frac{15}{8} - 7x = 9$, then $-7x = 9 + \frac{15}{8}$.

Solution.

False

Given, $\frac{15}{8} - 7x = 9$

$\Rightarrow \qquad -7x = 9 - \frac{15}{8} \qquad \left[\text{transposing } \frac{15}{8} \text{ to RHS}\right]$

Question. 43

If $\frac{x}{3} + 1 = \frac{7}{15}$, then $\frac{x}{3} = \frac{6}{15}$.

Solution.

False

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

$\Rightarrow \qquad \frac{x}{3} = \frac{7}{15} - 1 \qquad$ [transposing 1 to RHS]

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

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

Question. 44 If 6x = 18, then 18x = 54.

Solution.

True

Given,

$$6x = 18$$

$$\Rightarrow \qquad 3 \times 6x = 18 \times 3 \qquad \text{[multiplying both sides by 3]}$$

$$\Rightarrow \qquad 18x = 54$$

Question. 45 If $\frac{x}{11}$, then x=$\frac{11}{15}$.

Solution.

False

Given,

$$\frac{x}{11} = 15$$

$$\Rightarrow \qquad x = 11 \times 15 \qquad \text{[by cross-multiplication]}$$

Question. 46 If x is an even number, then the next even number is 2(x +1).

Solution. False

Given, x is an even number. Then, the next even number is (x + 2).

Question. 47 If the sum of two consecutive numbers is 93 and one of them is x, then the other number is 93 − x.

Solution. True

Given, one of the consecutive number = x

Then, the next consecutive number = x + 1

According to the question,

$$x + x + 1 = 93$$

$$\Rightarrow \qquad 2x = 93 - 1 \qquad \text{[transposing 1 to RHS]}$$

$$\Rightarrow \qquad 2x = 92$$

$$\Rightarrow \qquad \frac{2x}{2} = \frac{92}{2} \qquad \text{[dividing both sides by 2]}$$

$$\therefore \qquad x = 46$$

Hence, the other consecutive number = 46 + 1 = 47 = 93 − 46 = 93 − x

Question. 48 Two numbers differ by 40. When each number is increased by 8, the bigger becomes thrice the lesser number. If one number is x, then the other number is (40 − x).

Solution.

False

Given, one number = x

and other number = 40 − x

Let (40 − x) > x

Then, according to the question,

$$40 - x + 8 = 3(x + 8)$$

$$\Rightarrow \qquad 48 - x = 3x + 24$$

$$\Rightarrow \qquad -x - 3x = 24 - 48 \qquad \text{[transposing 3x to LHS and 48 to RHS]}$$

$$\Rightarrow \qquad -4x = -24$$

$$\Rightarrow \qquad x = -24 \times \left(-\frac{1}{4}\right)$$

$$\therefore \qquad x = 6$$

Hence, one number = x = 6

and other number = 40 − x = 40 − 6 = 34

Now, difference between numbers = 34 − 6 = 28 ≠ 40

which is not satisfy the condition given in question.

In Questions 49 to 78, solve the following.

Question. 49 $\frac{3x-8}{2x} = 1$.

Solution.

Given,
$$\frac{3x - 8}{2x} = 1$$

$\Rightarrow$ $3x - 8 = 2x$ [by cross-multiplication]

$\Rightarrow$ $3x - 2x = 8$ [transposing $2x$ to LHS and 8 to RHS]

$\therefore$ $x = 8$

Question. 50 $\frac{5x}{2x-1} = 2$.

Solution.

Given,
$$\frac{5x}{2x - 1} = 2$$

     $5x = 2(2x - 1)$ [by cross-multiplication]

$\Rightarrow$ $5x = 4x - 2$

$\Rightarrow$ $5x - 4x = -2$ [transposing $4x$ to LHS]

$\therefore$ $x = -2$

Question. 51 $\frac{2x-3}{4x+5} = \frac{1}{3}$.

Solution.

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

$\Rightarrow$ $3(2x - 3) = 4x + 5$ [by cross-multiplication]

$\Rightarrow$ $6x - 9 = 4x + 5$

$\Rightarrow$ $6x - 4x = 9 + 5$ [transposing $4x$ to LHS and -9 to RHS]

$\Rightarrow$ $2x = 14$

$\Rightarrow$ $\frac{2x}{2} = \frac{14}{2}$ [dividing both sides by 2]

$\therefore$ $x = 7$

Question. 52 $\frac{8}{x} = \frac{5}{x-1}$.

Solution.

Given,
$$\frac{8}{x} = \frac{5}{x - 1}$$

$\Rightarrow$ $8(x - 1) = 5x$ [by cross-multiplication]

$\Rightarrow$ $8x - 8 = 5x$

$\Rightarrow$ $8x - 5x = 8$ [transposing $5x$ to LHS and -8 to RHS]

$\Rightarrow$ $3x = 8$

$\Rightarrow$ $\frac{3x}{3} = \frac{8}{3}$ [dividing both sides by 3]

$\therefore$ $x = \frac{8}{3}$

Question. 53 $\frac{5(1-x)+3(1+x)}{1-2x} = 8$.

Solution.

Given,
$$\frac{5(1 - x) + 3(1 + x)}{1 - 2x} = 8$$

$\Rightarrow$ $5(1 - x) + 3(1 + x) = 8(1 - 2x)$ [by cross-multiplication]

$\Rightarrow$ $5 - 5x + 3 + 3x = 8 - 16x$

$\Rightarrow$ $8 - 2x = 8 - 16x$

$\Rightarrow$ $16x - 2x = 8 - 8$ [transposing $-16x$ to LHS and 8 to RHS]

$\Rightarrow$ $14x = 0$

$\Rightarrow$ $\frac{14x}{14} = \frac{0}{14}$ [dividing both sides by 14]

$\therefore$ $x = 0$

Question. 54 $\frac{0.2x+5}{3.5x-3} = \frac{2}{5}$

Solution.

Given, $$\frac{0.2x + 5}{3.5x - 3} = \frac{2}{5}$$

$\Rightarrow$ $\quad 5(0.2\ x + 5) = 2\ (3.5x - 3)$ $\qquad$ [by cross-multiplication]

$\Rightarrow$ $\quad x + 25 = 7x - 6$

$\Rightarrow$ $\quad x - 7x = -6 - 25$ $\qquad$ [transposing $7x$ to LHS and 25 to RHS]

$\Rightarrow$ $\quad -6x = -31$

$\Rightarrow$ $\quad \dfrac{-6x}{-6} = \dfrac{-31}{-6}$ $\qquad$ [dividing both sides by -6]

$\therefore$ $\quad x = \dfrac{31}{6}$

Question. 55 $\dfrac{y-(4-3y)}{2y-(3y+4y)} = \dfrac{1}{5}$

Solution.

Given, $$\frac{y - (4 - 3y)}{2y - (3 + 4y)} = \frac{1}{5}$$

$\Rightarrow$ $\quad 5(y - 4 + 3y) = 2y - 3 - 4y$ $\qquad$ [by cross-multiplication]

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

$\Rightarrow$ $\quad 20y - 20 = -3 - 2y$

$\Rightarrow$ $\quad 20y + 2y = 20 - 3$ $\qquad$ [transposing -20 to RHS and $-2y$ to LHS]

$\Rightarrow$ $\quad 22y = 17$

$\Rightarrow$ $\quad \dfrac{22y}{22} = \dfrac{17}{22}$ $\qquad$ [dividing both sides by 22]

$\therefore$ $\quad y = \dfrac{17}{22}$

Question. 56 $\dfrac{x}{5} = \dfrac{x-1}{6}$

Solution.

Given, $$\frac{x}{5} = \frac{x - 1}{6}$$

$\Rightarrow$ $\quad 6x = 5(x - 1)$ $\qquad$ [by cross-multiplication]

$\Rightarrow$ $\quad 6x = 5x - 5$

$\Rightarrow$ $\quad 6x - 5x = -5$ $\qquad$ [transposing $5x$ to LHS]

$\therefore$ $\quad x = -5$

Question. 57 0.4(3x-1)=0.5x +1

Solution.

Given, $\quad 0.4\ (3x - 1) = 0.5\ x + 1$

$\Rightarrow$ $\quad 1.2x - 0.4 = 0.5x + 1$

$\Rightarrow$ $\quad 1.2x - 0.5x = 1 + 0.4$ $\qquad$ [transposing $0.5x$ to LHS and -0.4 to RHS]

$\Rightarrow$ $\quad 0.7x = 1.4$

$\Rightarrow$ $\quad \dfrac{0.7x}{0.7} = \dfrac{1.4}{0.7}$ $\qquad$ [dividing both sides by 0.7]

$\therefore$ $\quad x = 2$

Question. 58 8x-7-3x=6x-2x-3

Solution.

Given, $\quad 8x - 7 - 3x = 6x - 2x - 3$

$\Rightarrow 8x - 3x - 6x + 2x = -3 + 7$ $\qquad$ [transposing $6x$, $-2x$ to LHS and -7 to RHS]

$\therefore$ $\qquad x = 4$

Question. 59 10x-5-7x=5x+15-8

Solution.

Given, $10x - 5 - 7x = 5x + 15 - 8$

$\Rightarrow$ $\quad 10x - 7x - 5x = 5 + 15 - 8$ $\qquad$ [transposing $5x$ to LHS and -5 to RHS]

$\Rightarrow$ $\quad -2x = 12$

$\Rightarrow$ $\quad \dfrac{-2x}{-2} = \dfrac{12}{-2}$ $\qquad$ [dividing both sides by -2]

$\therefore$ $\quad x = -6$

Question. 60 4t-3-(3t+1)=5t-4

Solution.

Given, $4t - 3 - (3t + 1) = 5t - 4$

$\Rightarrow \quad 4t - 3 - 3t - 1 = 5t - 4$

$\Rightarrow \quad t - 4 = 5t - 4$

$\Rightarrow \quad t - 5t = -4 + 4$ [transposing 5t to LHS and –4 to RHS]

$\Rightarrow \quad -4t = 0$

$\Rightarrow \quad \dfrac{-4t}{-4} = \dfrac{0}{-4}$ [dividing both sides by –4]

$\therefore \quad t = 0$

Question. 61 5(x-1)-2(x+8)=0

Solution.

Given, $5(x - 1) - 2(x + 8) = 0$

$\Rightarrow \quad 5x - 5 - 2x - 16 = 0$

$\Rightarrow \quad 3x - 21 = 0$

$\Rightarrow \quad 3x = 21$ [transposing –21 to RHS]

$\Rightarrow \quad \dfrac{3x}{3} = \dfrac{21}{3}$ [dividing both sides by 3]

$\therefore \quad x = 7$

Question. 62 $\frac{x}{2} - \frac{1}{4}\left(x - \frac{1}{3}\right) = \frac{1}{6}\left(x + 1\right) + \frac{1}{12}$

Solution.

Given, $\dfrac{x}{2} - \dfrac{1}{4}\left(x - \dfrac{1}{3}\right) = \dfrac{1}{6}(x + 1) + \dfrac{1}{12}$

$\Rightarrow \quad \dfrac{x}{2} - \dfrac{x}{4} + \dfrac{1}{12} = \dfrac{x}{6} + \dfrac{1}{6} + \dfrac{1}{12}$

$\Rightarrow \quad \dfrac{2x - x}{4} + \dfrac{1}{12} = \dfrac{x}{6} + \dfrac{2 + 1}{12}$

$\Rightarrow \quad \dfrac{x}{4} + \dfrac{1}{12} = \dfrac{x}{6} + \dfrac{3}{12}$

$\Rightarrow \quad \dfrac{x}{4} - \dfrac{x}{6} = \dfrac{3}{12} - \dfrac{1}{12}$ $\left[\text{transposing } \dfrac{x}{6} \text{ to LHS and} \dfrac{1}{12} \text{ to RHS}\right]$

$\Rightarrow \quad \dfrac{6x - 4x}{24} = \dfrac{3 - 1}{12}$

$\Rightarrow \quad \dfrac{2x}{24} = \dfrac{2}{12}$

$\Rightarrow \quad 2 \times 12x = 2 \times 24$ [by cross-multiplication]

$\Rightarrow \quad 24x = 48$

$\Rightarrow \quad \dfrac{24x}{24} = \dfrac{48}{24}$ [dividing both sides by 24]

$\therefore \quad x = 2$

Question. 63 $\frac{1}{2}(x + 1) + \frac{1}{3}(x - 1) = \frac{5}{12}(x - 2)$

Solution.

Given, $\dfrac{1}{2}(x + 1) + \dfrac{1}{3}(x - 1) = \dfrac{5}{12}(x - 2)$

$\Rightarrow \quad \dfrac{x}{2} + \dfrac{1}{2} + \dfrac{x}{3} - \dfrac{1}{3} = \dfrac{5x}{12} - \dfrac{5}{6}$

$\Rightarrow \quad \dfrac{x}{2} + \dfrac{x}{3} - \dfrac{5x}{12} = \dfrac{1}{3} - \dfrac{1}{2} - \dfrac{5}{6}$ $\left[\text{transposing } \dfrac{1}{2}, \dfrac{1}{3} \text{ to RHS and} \dfrac{5x}{12} \text{ to LHS}\right]$

$\Rightarrow \quad \dfrac{6x + 4x - 5x}{12} = \dfrac{2 - 3 - 5}{6}$

$\Rightarrow \quad \dfrac{5x}{12} = \dfrac{-6}{6}$

$\Rightarrow \quad 5x \times 6 = (-6) \times 12$ [by cross-multiplication]

$\Rightarrow \quad x = \dfrac{(-6) \times 12}{5 \times 6}$

$\therefore \quad x = \dfrac{-12}{5}$

Question. 64 $\frac{x+1}{4} = \frac{x-2}{3}$

Solution.

Given, $\quad \dfrac{x+1}{4} = \dfrac{x-2}{3}$

$\Rightarrow \qquad 3(x+1) = 4(x-2) \qquad$ [by cross-multiplication]

$\Rightarrow \qquad 3x+3 = 4x-8$

$\Rightarrow \qquad 3x-4x = -8-3 \qquad$ [transposing $4x$ to LHS and 3 to RHS]

$\Rightarrow \qquad -x = -11 \qquad$ [dividing both sides by –1]

$\Rightarrow \qquad \dfrac{-x}{-1} = \dfrac{-11}{-1}$

$\therefore \qquad x = 11$

Question. 65 $\frac{2x-1}{5} = \frac{3x+1}{3}$

Solution. Given $\frac{2x-1}{5} = \frac{3x+1}{3}$

$\Rightarrow \qquad 3(2x-1) = 5(3x+1) \qquad$ [by cross-multiplication]

$\Rightarrow \qquad 6x-3 = 15x+5$

$\Rightarrow \qquad 6x-15x = 3+5 \qquad$ [transposing $15x$ to LHS and –3 to RHS]

$\Rightarrow \qquad -9x = 8$

$\Rightarrow \qquad \dfrac{-9x}{-9} = \dfrac{8}{-9} \qquad$ [dividing both sides by –9]

$\therefore \qquad x = \dfrac{-8}{9}$

Question. 66 1-(x-2)-[(x-3)-(x-1)]=0

Solution.

Given, $\quad 1-(x-2)-[(x-3)-(x-1)] = 0$

$\Rightarrow \qquad 1-x+2-[x-3-x+1] = 0$

$\Rightarrow \qquad 3-x-[-2] = 0$

$\Rightarrow \qquad 3-x+2 = 0$

$\Rightarrow \qquad -x+5 = 0$

$\Rightarrow \qquad -x = -5 \qquad$ [transposing 5 to RHS]

$\Rightarrow \qquad \dfrac{-x}{-1} = \dfrac{-5}{-1} \qquad$ [dividing both sides by –1]

$\therefore \qquad x = 5$

Question. 67 $3x - \frac{x-2}{3} = 4 - \frac{x-1}{4}$

Solution.

Given, $\quad 3x - \dfrac{x-2}{3} = 4 - \dfrac{x-1}{4}$

$\Rightarrow \qquad \dfrac{9x-(x-2)}{3} = \dfrac{16-(x-1)}{4}$

$\Rightarrow \qquad 4(9x-x+2) = 3(16-x+1) \qquad$ [by cross-multiplication]

$\Rightarrow \qquad 4(8x+2) = 3(-x+17)$

$\Rightarrow \qquad 32x+8 = -3x+51$

$\Rightarrow \qquad 32x+3x = 51-8 \qquad$ [transposing $-3x$ to LHS and 8 to RHS]

$\Rightarrow \qquad 35x = 43$

$\Rightarrow \qquad \dfrac{35x}{35} = \dfrac{43}{35} \qquad$ [dividing both sides by 35]

$\therefore \qquad x = \dfrac{43}{35}$

Question. 68 $\frac{3t+5}{4} - 1 = \frac{4t-3}{5}$

Solution.

Given, $\quad \dfrac{3t+5}{4} - 1 = \dfrac{4t-3}{5}$

$\Rightarrow \qquad \dfrac{3t+5-4}{4} = \dfrac{4t-3}{5}$

$\Rightarrow \qquad 5(3t+5-4) = 4(4t-3) \qquad$ [by cross-multiplication]

$$\Rightarrow \quad 5(3t + 1) = 4(4t - 3)$$
$$\Rightarrow \quad 15t + 5 = 16t - 12$$
$$\Rightarrow \quad 15t - 16t = -12 - 5 \quad \text{[transposing 16t to LHS and 5 to RHS]}$$
$$\Rightarrow \quad -t = -17$$
$$\Rightarrow \quad \frac{-t}{-1} = \frac{-17}{-1} \quad \text{[dividing both sides by –1]}$$
$$\therefore \quad t = 17$$

Question. 69 $\frac{2y-3}{4} - \frac{3y-5}{2} = y + \frac{3}{4}$

Solution.

Given,
$$\frac{2y - 3}{4} - \frac{3y - 5}{2} = y + \frac{3}{4}$$
$$\Rightarrow \quad \frac{2y - 3 - 2(3y - 5)}{4} = \frac{4y + 3}{4}$$
$$\Rightarrow \quad 2y - 3 - 6y + 10 = 4y + 3$$
$$\Rightarrow \quad -4y + 7 = 4y + 3 \quad \text{[transposing 4y to LHS and 7 to RHS]}$$
$$\Rightarrow \quad -4y - 4y = 3 - 7$$
$$\Rightarrow \quad -8y = -4$$
$$\Rightarrow \quad \frac{-8y}{-8} = \frac{-4}{-8} \quad \text{[dividing both sides by –8]}$$
$$\therefore \quad y = \frac{1}{2}$$

Question. 70 0.25(4x-5)=0.75x +8

Solution.

Given,
$$0.25(4x - 5) = 0.75x + 8$$
$$\Rightarrow \quad x - 1.25 = 0.75x + 8$$
$$\Rightarrow \quad x - 0.75x = 1.25 + 8 \quad \text{[transposing 0.75 x to LHS and 1.25 to RHS]}$$
$$\Rightarrow \quad 0.25x = 9.25$$
$$\Rightarrow \quad \frac{0.25x}{0.25} = \frac{9.25}{0.25} \quad \text{[dividing both sides by 0.25]}$$
$$\therefore \quad x = 37$$

Question. 71 $\frac{9-3y}{1-9y} = \frac{8}{5}$

Solution.

Given,
$$\frac{9 - 3y}{1 - 9y} = \frac{8}{5}$$
$$\Rightarrow \quad 5(9 - 3y) = 8(1 - 9y) \quad \text{[by cross-multiplication]}$$
$$\Rightarrow \quad 45 - 15y = 8 - 72y$$
$$\Rightarrow \quad 72y - 15y = 8 - 45 \quad \text{[transposing –72y to LHS and 45 to RHS]}$$
$$\Rightarrow \quad 57y = -37$$
$$\Rightarrow \quad \frac{57y}{57} = \frac{-37}{57} \quad \text{[dividing both sides by 57]}$$
$$\therefore \quad y = \frac{-37}{57}$$

Question. 72 $\frac{3x+2}{2x-3} = -\frac{3}{4}$

Solution.

Given,
$$\frac{3x + 2}{2x - 3} = -\frac{3}{4}$$
$$\Rightarrow \quad 4(3x + 2) = -3(2x - 3) \quad \text{[by cross-multiplication]}$$
$$\Rightarrow \quad 12x + 8 = -6x + 9$$
$$\Rightarrow \quad 12x + 6x = 9 - 8 \quad \text{[transposing –6x to LHS and 8 to RHS]}$$
$$\Rightarrow \quad 18x = 1$$
$$\Rightarrow \quad \frac{18x}{18} = \frac{1}{18} \quad \text{[dividing both sides by 18]}$$
$$\therefore \quad x = \frac{1}{18}$$

Question. 73 $\frac{5x+1}{2x} = -\frac{1}{3}$

Solution.

Given, $\dfrac{5x + 1}{2x} = -\dfrac{1}{3}$

$\Rightarrow \quad 3(5x + 1) = -2x$ [by cross-multiplication]

$\Rightarrow \quad 15x + 3 = -2x$

$\Rightarrow \quad 15x + 2x = -3$ [transposing $-2x$ to LHS and 3 to RHS]

$\Rightarrow \quad 17x = -3$

$\Rightarrow \quad \dfrac{17x}{17} = \dfrac{-3}{17}$ [dividing both sides by 17]

$\therefore \quad x = \dfrac{-3}{17}$

Question. 74 $\dfrac{3t-2}{3} + \dfrac{2t+3}{2} = t + \dfrac{7}{6}$

Solution.

Given, $\dfrac{3t - 2}{3} + \dfrac{2t + 3}{2} = t + \dfrac{7}{6}$

$\Rightarrow \quad \dfrac{2(3t - 2) + 3(2t + 3)}{6} = \dfrac{6t + 7}{6}$

$\Rightarrow \quad 6t - 4 + 6t + 9 = 6t + 7$

$\Rightarrow \quad 12t + 5 = 6t + 7$

$\Rightarrow \quad 12t - 6t = 7 - 5$ [transposing $6t$ to LHS and 5 to RHS]

$\Rightarrow \quad 6t = 2$

$\Rightarrow \quad \dfrac{6t}{6} = \dfrac{2}{6}$ [dividing both sides by 6]

$\therefore \quad t = \dfrac{1}{3}$

Question. 75 $m - \dfrac{m-1}{2} = 1 - \dfrac{m-2}{3}$

Solution. Given $m - \dfrac{m-1}{2} = 1 - \dfrac{m-2}{3}$

$\Rightarrow \quad \dfrac{2m - (m - 1)}{2} = \dfrac{3 - (m - 2)}{3}$

$\Rightarrow \quad 3(2m - m + 1) = 2(3 - m + 2)$ [by cross multiplication]

$\Rightarrow \quad 3(m + 1) = 2(5 - m)$

$\Rightarrow \quad 3m + 3 = 10 - 2m$

$\Rightarrow \quad 3m + 2m = 10 - 3$ [transposing $-2m$ to LHS and 3 to RHS]

$\Rightarrow \quad 5m = 7$

$\Rightarrow \quad \dfrac{5m}{5} = \dfrac{7}{5}$ [dividing both sides by 5]

$\therefore \quad m = \dfrac{7}{5}$

Question. 76 $4(3p + 2) - 5(6p - 1) = 2(p - 8) - 6(7p - 4)$

Solution.

Given, $4(3p + 2) - 5(6p - 1) = 2(p - 8) - 6(7p - 4)$

$\Rightarrow \quad 12p + 8 - 30p + 5 = 2p - 16 - 42p + 24$

$\Rightarrow \quad -18p + 13 = -40p + 8$

$\Rightarrow \quad -18p + 40p = 8 - 13$ [transposing $-40p$ to LHS and 13 to RHS]

$\Rightarrow \quad 22p = -5$

$\Rightarrow \quad \dfrac{22p}{22} = \dfrac{-5}{22}$ [dividing both sides by 22]

$\therefore \quad p = \dfrac{-5}{22}$

Question. 77 3(5x-2)+2(9x-11)=4(8x-7)-111

Solution.

Given, $3(5x - 7) + 2(9x - 11) = 4(8x - 7) - 111$

$\Rightarrow \quad 15x - 21 + 18x - 22 = 32x - 28 - 111$

$\Rightarrow \quad 33x - 43 = 32x - 139$

$\Rightarrow \quad 33x - 32x = -139 + 43$ [transposing $32x$ to LHS and -43 to RHS]

$\therefore \quad x = -96$

Question. 78 0.16 (5x-2)=0.4x +7

Solution.

Given,

$$0.16(5x - 2) = 0.4x + 7$$
$$\Rightarrow \quad 0.8x - 0.32 = 0.4x + 7$$
$$\Rightarrow \quad 0.8x - 0.4x = 0.32 + 7 \quad \text{[transposing } 0.4x \text{ to LHS and } - 0.32 \text{ to RHS]}$$
$$\Rightarrow \quad 0.4x = 7.32$$
$$\Rightarrow \quad \frac{0.4x}{0.4} = \frac{7.32}{0.4} \quad \text{[dividing both sides by 0.4]}$$
$$\therefore \quad x = 18.3$$

Question. 79 Radha takes some flowers in a basket and visits three temples one-by-one. At each temple, she offers one half of the flowers from the basket. If she is left with 3 flowers at the end, then find the number of flowers she had in the beginning.

Solution.

Let total number of the flowers be x.

Then, flowers offered in first temple $= \dfrac{x}{2}$

Flowers offered in second temple $= \dfrac{x}{4}$

Flowers offered in third temple $= \dfrac{x}{8}$

Number of flowers left at the end $= 3$

According to the question,

$$x - \left(\frac{x}{2} + \frac{x}{4} + \frac{x}{8}\right) = 3$$
$$\Rightarrow \quad \frac{8x - (4x + 2x + x)}{8} = 3$$
$$\Rightarrow \quad 8x - 7x = 24$$
$$\therefore \quad x = 24$$

Hence, total number of flowers she had in the beginning is 24.

Question. 80 Rs 13500 are to be distributed among Salma, Kiran and Jenifer in such a way that Salma gets Rs 1000 more than Kiran and Jenifer gets Rs 500 more than Kiran. Find the money received by Jenifer.

Solution.

Let the money received by Kiran be ₹ x.

Then, the money received by Salma = ₹ $(x + 1000)$

and the money received by Jenifer = ₹ $(x + 500)$

According to the question,

$$x + x + 1000 + x + 500 = 13500$$
$$\Rightarrow \quad 3x + 1500 = 13500$$
$$\Rightarrow \quad 3x = 13500 - 1500$$
$$\Rightarrow \quad 3x = 12000$$
$$\Rightarrow \quad x = \frac{12000}{3}$$
$$\therefore \quad x = 4000$$

Hence, the money received by Jenifer = ₹ $4000 + 500 = $ ₹4500

Question. 81 The volume of water in a tank is twice of that in the other. If we draw out 25 litres from the first and add it to the other, the volumes of the water in each tank will be the same. Find the volumes of water in each tank.

Solution.

Let volume of water in one tank be x L.

Then, volume of the water in another tank $= 2x$ L.

According to the question,

Volume of the water in first tank + 25 = Volume of the water in another tank – 25

$$\Rightarrow \quad x + 25 = 2x - 25$$
$$\Rightarrow \quad 2x - x = 25 + 25$$
$$\therefore \quad x = 50$$

Hence, volume of water in one tank = 50 L

and volume of the water in another tank $= 2 \times 50 = 100$ L

Question. 82 Anushka and Aarushi are friends. They have equal amount of money in their pockets. Anushka gave 1/3 of her money to Aarushi as her birthday gift. Then, Aarushi gave a party at a restaurant and cleared the bill by paying half of the total money with her. If the remaining money in Aarushi's pocket is Rs 1600, then find the sum gifted by Anushka.

Solution.

Let Anushka and Aarushi have equal amount of money in their packet, which is ₹ x.

After giving $\frac{1}{3}$ of the money of Anushka to Aarushi,

Amount of Aarushi = ₹ $\left(x + \dfrac{x}{3}\right)$

According to the question,

$$\left(x + \frac{x}{3}\right) - \frac{1}{2} \times \left(x + \frac{x}{3}\right) = 1600$$

$$\Rightarrow \qquad \left(x + \frac{x}{3}\right)\left(1 - \frac{1}{2}\right) = 1600$$

$$\Rightarrow \qquad \left(x + \frac{x}{3}\right) \times \frac{1}{2} = 1600$$

$$\Rightarrow \qquad \frac{3x + x}{3} = 1600 \times 2$$

$$\Rightarrow \qquad \frac{4x}{3} = 3200$$

$$\therefore \qquad x = 3200 \times \frac{3}{4} = 2400$$

So, money gifted by Anushka = $\frac{1}{3}$ of 2400 = $\frac{1}{3} \times 2400$ = ₹ 800

Question. 83 Kaustubh had 60 flowers. He offered some flowers in temple and found that the ratio of the number of remaining flowers to that of flowers in the beginning is 3 : 5. Find the number of flowers offered by him in the temple.

Solution.

Let number of flowers offered by Kaustubh in the temple be x.

Then, remaining flowers = $60 - x$

According to the question,

$$\frac{\text{Number of remaining flowers}}{\text{Number of flowers in beginning}} = \frac{3}{5} \qquad \text{[given]}$$

$$\Rightarrow \qquad \frac{60 - x}{60} = \frac{3}{5}$$

$$\Rightarrow \qquad 300 - 5x = 180$$

$$\Rightarrow \qquad 5x = 300 - 180$$

$$\Rightarrow \qquad 5x = 120$$

$$\Rightarrow \qquad x = \frac{120}{5}$$

$$\therefore \qquad x = 24$$

Hence, the number of flowers offered by Kaustubh in the temple is 24.

Question. 84 The sum of three consecutive even natural numbers is 48. Find the greatest of these numbers.

Solution.

Let the three consecutive even natural numbers be x, $(x + 2)$ and $(x + 4)$.

According to the question,

$$x + (x + 2) + (x + 4) = 48 \qquad \text{[given]}$$

$$\Rightarrow \qquad 3x + 6 = 48$$

$$\Rightarrow \qquad 3x = 48 - 6$$

$$\Rightarrow \qquad 3x = 42 \quad \Rightarrow \quad x = \frac{42}{3}$$

$$\therefore \qquad x = 14$$

Hence, the three consecutive even natural numbers are 14, (14 + 2) and (14 + 4), i.e. 14, 16 and 18.

Therefore, the greatest number is 18.

Question. 85 The sum of three consecutive odd natural numbers is 69. Find the prime

number out of these numbers.
Solution.

Let the three consecutive odd natural numbers be x, $(x + 2)$ and $(x + 4)$.

According to the question,

$$x + (x + 2) + (x + 4) = 69 \qquad \text{[given]}$$
$$\Rightarrow \qquad 3x + 6 = 69$$
$$\Rightarrow \qquad 3x = 69 - 6 \Rightarrow 3x = 63$$
$$\therefore \qquad x = 63 \times \frac{1}{3} = 21$$

Thus, the three consecutive odd natural numbers are 21, (21 + 2) and (21 + 4), i.e. 21, 23 and 25. Out of these, only 23 is the prime number.

Question. 86 The sum of three consecutive numbers is 156. Find the number which is a multiple of 13 out of these numbers.
Solution.

Let three consecutive numbers be x, $(x + 1)$ and $(x + 2)$.

According to the question,

$$x + (x + 1) + (x + 2) = 156 \qquad \text{[given]}$$
$$\Rightarrow \qquad 3x + 3 = 156 \Rightarrow 3x = 156 - 3 = 153$$
$$\therefore \qquad x = 153 \times \frac{1}{3} = 51$$

Thus, we get the numbers 51, 51 + 1 and 51 + 2, i.e. 51, 52 and 53. Out of these, only 52 is a multiple of 13.

Question. 87 Find a number whose fifth part increased by 30 is equal to its fourth part decreased by 30.
Solution.

Let the number be x.

According to the question,

$$\frac{x}{5} + 30 = \frac{x}{4} - 30$$
$$\Rightarrow \qquad \frac{x}{5} - \frac{x}{4} = -30 - 30 \qquad \left[\text{transposing } \frac{x}{4} \text{ to LHS and 30 to RHS}\right]$$
$$\Rightarrow \qquad \frac{4x - 5x}{20} = -60$$
$$\Rightarrow \qquad -x = -60 \times 20 \qquad \text{[by cross-multiplication]}$$
$$\therefore \qquad x = 1200$$

Hence, the required number is 1200.

Question. 88 Divide 54 into two parts, such that one part is 2/7 of the other.
Solution.

Let the other part be x. Then, first part will be $\frac{2x}{7}$.

According to the question,

$$x + \frac{2x}{7} = 54$$
$$\Rightarrow \qquad \frac{7x + 2x}{7} = 54$$
$$\Rightarrow \qquad 9x = 7 \times 54 \qquad \text{[by cross-multiplication]}$$
$$\Rightarrow \qquad x = \frac{7 \times 54}{9}$$
$$\Rightarrow \qquad x = 7 \times 6$$
$$\Rightarrow \qquad x = 42$$

Hence, the first part $= \frac{2 \times 42}{7} = 12$

and the other part $= 42$

Question. 89 Sum of the digits of a two-digit number is 11. The given number is less than the number obtained by interchanging the digits by 9. Find the number.
Solution.

Let the unit's digit be x. Then, the ten's digit $= 11 - x$

$\therefore$ Number $= 10(11 - x) + x = 110 - 10x + x = 110 - 9x$

Number obtained by interchanging the digits $= 10x + (11 - x) = 9x + 11$

According to the question,

$$9x + 11 - (110 - 9x) = 9$$
$$\Rightarrow \quad 9x + 11 - 110 + 9x = 9$$
$$\Rightarrow \quad 18x = 9 - 11 + 110$$
$$\Rightarrow \quad 18x = 108$$
$$\Rightarrow \quad x = \frac{108}{18}$$
$$\Rightarrow \quad x = 6$$

Hence, unit's digit $= 6$ and ten's digit $= 11 - 6 = 5$

Therefore, the required number is 56.

Question. 90 Two equal sides of a triangle are each 4 m less than three times the third side. Find the dimensions of the triangle, if its perimeter is 55 m.

Solution.

Let the third side of triangle be x m.

Then, two equal sides of triangle $= (3x - 4)$ m

Given, perimeter of triangle $= 55$ m

$\because$ Perimeter of a triangle $=$ Sum of the sides of the triangle

$$\therefore \quad x + 3x - 4 + 3x - 4 = 55$$
$$\Rightarrow \quad 7x - 8 = 55 \quad \Rightarrow \quad 7x = 55 + 8$$
$$\Rightarrow \quad 7x = 63 \quad \Rightarrow \quad x = \frac{63}{7}$$
$$\therefore \quad x = 9$$

Hence, the dimensions of the triangle are 9 m, $(3 \times 9 - 4)$ m and $(3 \times 9 - 4)$ m, i.e. 9, $(27 - 4)$, and $(27 - 4)$ m, i.e. 9 m, 23 m and 23 m.

Question. 91 After 12 years, Kanwar shall be 3 times as old as he was 4 years ago. Find his present age.

Solution.

Let Kanwar's present age be x yr.

After 12 yr, Kanwar's age $= (x + 12)$ y

and 4 yr ago, Kanwar's age $= (x - 4)$ yr

According to the question,

$$x + 12 = 3(x - 4) \quad \Rightarrow \quad x + 12 = 3x - 12$$
$$\Rightarrow \quad 3x - x = 12 + 12 \quad \Rightarrow \quad 2x = 24$$
$$\Rightarrow \quad x = \frac{24}{2}$$
$$\therefore \quad x = 12$$

Hence, Kanwar's present age is 12 yr.

Question. 92 Anima left one-half of her property to her daughter, one-third to her son and donated the rest to an educational institute. If the donation was worth Rs 100000, how much money did Anima have?

Solution.

Let Anima's property be ₹ x.

Property left for her daughter = ₹ $\dfrac{x}{2}$

Remaining property = $x - \dfrac{x}{2} = \dfrac{2x - x}{2} = ₹ \dfrac{x}{2}$

Property left for her son = $\dfrac{1}{3}$ of remaining property = $\dfrac{1}{3} \times \dfrac{x}{2} = ₹ \dfrac{x}{6}$

Remaining property = $\left[x - \left(\dfrac{x}{2} + \dfrac{x}{6}\right)\right] = x - \left(\dfrac{3x + x}{6}\right) = \dfrac{6x - 4x}{6} = \dfrac{2x}{6} = ₹ \dfrac{x}{3}$

Since, the remaining property donated to an educational institute.

But donation property = ₹ 100000

∴ $\dfrac{x}{3} = 100000 \Rightarrow x = 300000$

Hence, Anima had ₹ 300000.

Question. 93 If 1/2 is subtracted from a number and the difference is multiplied by 4, the result is 5. What is the number?

Solution.

Let the number be x.

According to the question,

$$4\left(x - \dfrac{1}{2}\right) = 5 \quad \Rightarrow \quad 4x - 2 = 5$$

$$\Rightarrow \qquad 4x = 5 + 2 \quad \Rightarrow \quad 4x = 7$$

$$\therefore \qquad x = \dfrac{7}{4}$$

Hence, the required number is $\dfrac{7}{4}$.

Question. 94 The sum of four consecutive integers is 266. What are the integers?

Solution.

Let the four consecutive integers be x, $x + 1$, $x + 2$ and $x + 3$.

According to the question,

$$x + x + 1 + x + 2 + x + 3 = 266 \qquad \text{[given]}$$

$$\Rightarrow \qquad 4x + 6 = 266$$

$$\Rightarrow \qquad 4x = 266 - 6$$

$$\Rightarrow \qquad 4x = 260$$

$$\Rightarrow \qquad x = \dfrac{260}{4}$$

$$\therefore \qquad x = 65$$

Hence, the four consecutive integers are 65, 65 + 1, 65 + 2 and 65 + 3, i.e. 65, 66, 67 and 68.

Question. 95 Hamid has three boxes of different fruits. Box A weighs $2\frac{1}{2}$ kg more than box B and Box C weighs $10\frac{1}{4}$ kg more than box B. The total weight of the three boxes is $48\frac{3}{4}$ kg. How many kilograms does box A weigh?

Solution.

Let the weight of box A be x kg.

According to the question,

Weight of Box A = Weight of Box B + $\dfrac{5}{2}$ kg $\qquad$ [given]

$\Rightarrow \qquad$ Weight of box $B = \left(x - \dfrac{5}{2}\right)$ kg

and weight of Box C = Weight of box B + $\dfrac{41}{4}$ kg $\qquad$ [given]

$\Rightarrow \qquad$ Weight of Box $C = x - \dfrac{5}{2} + \dfrac{41}{4}$ kg $= x + \left(\dfrac{-10 + 41}{4}\right)$ kg $= \left(x + \dfrac{31}{4}\right)$ kg

As, total weight of three boxes = $48\dfrac{3}{4}$ kg = $\dfrac{195}{4}$ kg $\qquad$ [given]

$\because$ Total weight of three boxes = Weight of box A + Weight of box B + Weight of box C

$$\therefore \quad \frac{195}{4} = x + x - \frac{5}{2} + x + \frac{31}{4}$$

$$\Rightarrow \quad \frac{195}{4} = 3x + \frac{31-10}{4}$$

$$\Rightarrow \quad \frac{195}{4} = 3x + \frac{21}{4} \quad \Rightarrow \quad 3x = \frac{195}{4} - \frac{21}{4}$$

$$\Rightarrow \quad 3x = \frac{195-21}{4} \quad \Rightarrow \quad 3x = \frac{174}{4}$$

$$\Rightarrow \quad x = \frac{174}{3 \times 4} \quad \Rightarrow \quad x = \frac{29}{2}$$

$$\therefore \quad x = 14\frac{1}{2} \text{ kg}$$

Hence, box A weighs $14\frac{1}{2}$ kg.

Question. 96 The perimeter of a rectangle is 240 cm. If its length is increased by 10% and its breadth is decreased by 20%, then we get the same perimeter. Find the length and breadth of the rectangle.

Solution.

Given, perimeter of rectangle = 240 cm
$\Rightarrow \quad$ 2 $\times$ (Length + Breadth) = 240 cm
$\Rightarrow \quad$ Length + Breadth = 120 cm

Let the length of rectangle be x cm.

Then, the breadth of rectangle = $(120 - x)$ cm

$\therefore$ New length of rectangle = x + 10% of $x = x + \frac{10}{100} \times x = \frac{110}{100} x$ cm

and new breadth of rectangle = $(120 - x) - 20\%$ of $(120 - x)$ cm

$$= (120 - x) - \frac{20}{100} \times (120 - x)$$

$$= (120 - x)\left(1 - \frac{20}{100}\right) = \frac{80}{100}(120 - x) \text{ cm}$$

It is given that, perimeter of new rectangle is 240 cm.

According to the question,

$$2 \times (\text{New length} + \text{New breadth}) = 240$$

$$\Rightarrow \quad 2 \times \left[\frac{110x}{100} + \frac{80}{100}(120 - x)\right] = 240$$

$$\Rightarrow \quad \frac{110x + 9600 - 80x}{100} = \frac{240}{2}$$

$$\Rightarrow \quad 30x + 9600 = \frac{240}{2} \times 100$$

$$\Rightarrow \quad 30x + 9600 = 12000$$

$$\Rightarrow \quad 30x = 12000 - 9600$$

$$\Rightarrow \quad 30x = 2400$$

$$\Rightarrow \quad x = \frac{2400}{30} = 80$$

Hence, length of rectangle = 80 cm
and breadth of rectangle = 120 − 80 = 40 cm

Question. 97 The age of A is five years more than that of B. 5 years ago, the ratio of their ages was 3 :2. Find their present ages.

Solution.

Let the present age of B be x yr.

Then, the present age of $A = (x + 5)$ yr

Five years ago, age of $A = x + 5 - 5 = x$ yr

and age of $B = (x - 5)$ yr

According to the question,

$$\frac{x}{x-5} = \frac{3}{2}$$

$$\Rightarrow \quad 2x = 3(x - 5)$$

$$\Rightarrow \quad 2x = 3x - 15$$

$$\Rightarrow \quad 3x - 2x = 15$$

$$\therefore \quad x = 15$$

Hence, the present age of B is 15 yr and the present age of A is (15 + 5), i.e. 20 yr.

Question. 98 If numerator is 2 less than denominator of a rational number and when 1 is subtracted from numerator and denominator both, the rational number in its simplest form is 1/2. What is the rational number?

Solution.

Suppose denominator of a rational number be x.

Numerator = Denominator − 2 = $x − 2$

According to the question,

$$\frac{(x-2)-1}{x-1} = \frac{1}{2}$$

$\Rightarrow$ $\quad 2(x - 2 - 1) = x - 1$

$\Rightarrow$ $\quad 2(x - 3) = x - 1$

$\Rightarrow$ $\quad 2x - 6 = x - 1$

$\Rightarrow$ $\quad 2x - x = 6 - 1$

$\therefore$ $\quad x = 5$

Hence, denominator = 5 and numerator = 5 − 2 = 3

Thus, the rational number is $\frac{3}{5}$.

Question. 99 In a two-digit number, digit in unit's place is twice the digit in ten's place. If 27 is added to it, digits are reversed. Find the number.

Solution.

Let ten's digit of two-digit number be x.

Then, unit's digit = $2x$

$\therefore$ Number = $10 \times x + 2x = 10x + 2x = 12x$

On reversing the digits,

New number = $10 \times (2x) + x = 20x + x = 21x$

According to the question,

$$12x + 27 = 21x$$

$\Rightarrow$ $\quad 21x - 12x = 27$

$\Rightarrow$ $\quad 9x = 27$

$\Rightarrow$ $\quad x = 3$

Hence, the required number is 12×3, i.e. 36.

Question. 100 A man was engaged as typist for the month of February in 2009. He was paid Rs 500 per day, but Rs 100 per day were deducted for the days he remained absent. He received Rs 9100 as salary for the month. For how many days did he work?

Solution.

Let the man worked as a typist for x days in the month of February 2009.

Then, absent in the month of February 2009 = $(29 - x)$ days

[we know that, number of days in month of February 2009 is 29]

Per day payment = ₹ 500 [given]

Total paid amount for working days = ₹ $500x$

And per day deduction, when he remained absent = ₹ 100 [given]

Total amount deducted for being absent = ₹ $100 \times (29 - x)$

Given, salary received by man for the month of February is ₹ 9100.

According to the question,

$$500x - 100(29 - x) = 9100$$

$\Rightarrow$ $\quad 500x - 2900 + 100x = 9100$

$\Rightarrow$ $\quad 600x = 9100 + 2900$

$\Rightarrow$ $\quad 600x = 12000$

$\Rightarrow$ $\quad x = \frac{12000}{600}$

$\therefore$ $\quad x = 20$

Therefore, the man worked for 20 days.

Question. 101 A steamer goes downstream and covers the distance between two ports in 3 hours. It covers distance in 5 hours, when it goes upstream. If the stream flows at 3 km/h, then find what is the speed of the steamer upstream?

Solution.

Let speed of the steamer in still water be x km/h.

Speed of the stream = 3 km/h   [given]

Now, speed of the steamer downstream = $(x + 3)$ km/h

and speed of the steamer upstream = $(x - 3)$ km/h

According to the question,

Distance covered in 3 h by steamer downstream

     = Distance covered in 5 h by steamer upstream

$\therefore$ $3(x + 3) = 5(x - 3)$ [$\because$ distance = speed × time]

$\Rightarrow$ $3x + 9 = 5x - 15$

$\Rightarrow$ $3x - 5x = -15 - 9$

$\Rightarrow$ $-2x = -24$

$\Rightarrow$ $x = -24 \times \left(\dfrac{-1}{2}\right) = 12$ km/h

Hence, the speed of the steamer upstream is $(12 - 3)$, i.e. 9 km/h.

Question. 102 A lady went to a bank with Rs 100000. She asked the cashier to give her Rs 500 and Rs 1000 currency notes in return. She got 175 currency notes in all. Find the number of each kind of currency notes.

Solution.

Given, total number of currency notes = 175

Let the total number of notes of ₹ 500 be x.

Then, total number of notes of ₹ 1000 = $175 - x$

$\because$ Total amount which lady had = ₹ 100000   [given]

According to the question,

       $500x + (175 - x)1000 = 100000$

$\Rightarrow$ $500x + 175000 - 1000x = 100000$

$\Rightarrow$ $-500x = 100000 - 175000$

$\Rightarrow$ $-500x = -75000$

$\Rightarrow$ $x = -75000 \times \left(\dfrac{-1}{500}\right)$

$\therefore$ $x = 150$

Therefore, total number of notes of ₹ 500 = 150

and total number of notes of ₹ 1000 = $175 - 150 = 25$

Question. 103 There are 40 passengers in a bus, some with Rs 3 tickets and remaining with Rs 10 tickets. The total collection from these passengers is Rs 295. Find how many passengers have tickets worth Rs 3?

Solution.

Given, total number of passengers = 40

Let the number of passengers having tickets worth ₹ 3 be x.

Then, the number of passengers having tickets worth ₹ 10 = $(40 - x)$

Total collection from passengers = ₹ 295   [given]

According to the question,

       $3x + 10(40 - x) = 295$

$\Rightarrow$ $3x + 400 - 10x = 295$

$\Rightarrow$ $-7x = 295 - 400$

$\Rightarrow$ $-7x = -105$

$\Rightarrow$ $x = -105 \times \left(\dfrac{-1}{7}\right)$

$\therefore$ $x = 15$

Hence, the number of passengers having tickets worth ₹ 3 is 15

Question. 104 Denominator of a number is 4 less than its numerator. If 6 is added to the numerator, it becomes thrice the denominator. Find the fraction.

Solution.

Let the numerator of the number be x.

Then, denominator of the number $= x - 4$

$\therefore$ Fraction $= \dfrac{x}{x-4}$ ...(i)

According to the question, if 6 is added to numerator, it becomes thrice the denominator.

$\therefore$ $\qquad x + 6 = 3(x - 4)$

$\Rightarrow \qquad 3x - 12 = x + 6$

$\Rightarrow \qquad 3x - x = 6 + 12$

$\Rightarrow \qquad 2x = 18$

$\Rightarrow \qquad x = \dfrac{18}{2}$

$\therefore \qquad x = 9$

Hence, fraction $= \dfrac{x}{x-4} = \dfrac{9}{9-4} = \dfrac{9}{5}$

Question. 105 An employee works in a company on a contract of 30 days on the condition that he will receive Rs 120 for each day he works and he will be fined Rs 10 for each day he is absent. If he receives Rs 2300 in all, for how many days did he remain absent?

Solution.

Given, total number of days in contract = 30

Money received per day for working = ₹ 120

Money deducted per day for being absent = ₹ 10

and amount received by employee as salary = ₹ 2300

Let the employee remained absent for x days. Then, employee worked for $(30 - x)$ days.

According to the question,

$\qquad 120(30 - x) - 10x = 2300$

$\Rightarrow \qquad 3600 - 120x - 10x = 2300$

$\Rightarrow \qquad -130x = -3600 + 2300$

$\Rightarrow \qquad -130x = -1300$

$\Rightarrow \qquad x = -1300 \times \left(\dfrac{-1}{130}\right)$

$\therefore \qquad x = 10$

Therefore, employee remained absent for 10 days.

Question. 106 Kusum buys some chocolates at the rate of Rs 10 per chocolate. She also buys an equal number of candies at the rate of Rs 5 per candy. She makes a 20% profit on chocolates and 8% profit on candies. At the end of the day, all chocolates arid' candies are sold out and her profit is Rs 240. Find the number of chocolates purchased.

Solution.

Let Kusum purchased x chocolates.

Then, total cost of chocolates = ₹ $10x$

Similarly, she purchased x candies.

Then, total cost of candies = ₹ $5x$

According to the question,

Profit on chocolates = 20% of $10x = \dfrac{20}{100} \times 10x = $ ₹ $2x$

and profit on candies = 8% of $5x = \dfrac{8}{100} \times 5x = $ ₹ $0.4x$

$\therefore$ Total profit $= 2x + 0.4x = $ ₹ $2.4x$

But it is given that total profit is ₹ 240.

Again, according to the question,

$\qquad 2.4x = 240 \quad \Rightarrow \quad x = \dfrac{240}{2.4} = 100$

Hence, she purchased 100 chocolates.

Question. 107 A steamer goes downstream and covers the distance between two ports in 5 hours, while it covers the same distance upstream in 6 hours. If the speed of the stream is 1 km/h, then find the speed of the steamer in still water.

Solution.

Given, speed of stream = 1 km/h

Let speed of the steamer in still water be x km/h.

Then, speed of steamer downstream = $(x + 1)$ km/h

and speed of steamer upstream = $(x - 1)$ km/h

According to the question,

Distance covered upstream = Distance covered downstream

$\Rightarrow$ (Speed of steamer in upstream) × Time taken upstream

= (Speed of steamer downstream) × Time taken downstream

[∵ distance = speed × time]

$\Rightarrow \qquad\qquad (x - 1) \times 6 = (x + 1) \times 5$

$\Rightarrow \qquad\qquad 6x - 6 = 5x + 5$

$\Rightarrow \qquad\qquad 6x - 5x = 6 + 5$

$\therefore \qquad\qquad x = 11$

Therefore, the speed of steamer in still water is 11 km/h.

Question. 108 Distance between two places A and B is 210 km. Two cars start simultaneously from A and B in opposite directions and distance between them after 3 hours is 54 km. If speed of one car is less than that of other by 8 km/h, then find the speed of each.

Solution.

Let the speed of car starts from A be x km/h.

Then, speed of car starts from B = $(x + 8)$ km/h

Given, distance between the cars after 3 h = 54 km

According to the question,

Total distance between A and B – Total distance covered by both cars in 3 h = 54

$\Rightarrow \qquad 210 - [3x + 3(x + 8)] = 54$ [∵ distance = speed × time]

$\Rightarrow \qquad 210 - 3x - 3x - 24 = 54$

$\Rightarrow \qquad\qquad -6x = -210 + 24 + 54$

$\Rightarrow \qquad\qquad -6x = -210 + 78$

$\Rightarrow \qquad\qquad -6x = -132$

$\Rightarrow \qquad\qquad x = -132 \times \left(\dfrac{-1}{6}\right)$

$\therefore \qquad\qquad x = 22$

Hence, the speed of car starts from A = 22 km/h

and the speed of car starts from B = 22 + 8 = 30 km/h
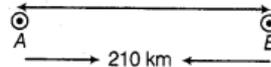
Question. 109 A carpenter charged Rs 2500 for making a bed. The cost of materials used is Rs 1100 and the labour charge is Rs 200 per hour. For how many hours did the carpenter work?

Solution.

Let the carpenter worked for x h.

Given, labour charge = ₹ 200 per hour

Then, total labour charge = ₹ 200x
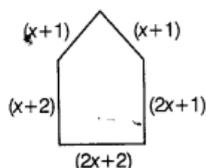
As, amount charged by carpenter for making a bed

= Cost of materials + Total labour charge

$\therefore \qquad 2500 = 1100 + 200x \Rightarrow 200x = 2500 - 1100$

$\Rightarrow \qquad 200x = 1400 \Rightarrow x = \dfrac{1400}{200} = 7$

Hence, the carpenter worked for 7 h.

Question. 110 For what value of x is the perimeter of shape 77 cm?

Solution.

Given, perimeter of shape = 77 cm
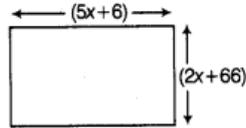
∴ Sum of all sides of the shape = 77

$\Rightarrow (x + 1) + (x + 1) + (x + 2) + (2x + 1) + (2x + 2) = 77$

$\Rightarrow \qquad\qquad\qquad 7x + 7 = 77 \quad\Rightarrow\quad 7x = 77 - 7$

$\Rightarrow \qquad\qquad\qquad 7x = 70 \quad\Rightarrow\quad x = \dfrac{70}{7} = 10$

Hence, the value of x is 10 cm.

Question. 111 For what value of x is the perimeter of shape 186 cm?

Solution.

Given, length of the given figure = $(5x + 6)$

and breadth of the given figure = $(2x + 66)$

∵ Perimeter of shape = 186 cm   [given]

$\therefore \qquad\qquad 2 \times (\text{Length} + \text{Breadth}) = 186$

$\Rightarrow \qquad 2 \times [(5x + 6) + (2x + 66)] = 186$

$\Rightarrow \qquad\qquad 2 \times [7x + 72] = 186$

$\Rightarrow \qquad\qquad 14x + 144 = 186$

$\Rightarrow \qquad\qquad 14x = 186 - 144$

$\Rightarrow \qquad\qquad 14x = 42$

$\Rightarrow \qquad\qquad x = \dfrac{42}{14}$

$\therefore \qquad\qquad x = 3$

Hence, the value of x is 3 cm.

Question. 112 On dividing Rs 200 between A and B, such that twice of A's share is less than 3 times B's share by 200, what is B's share?

Solution.

Let B's share be ₹ x. Then, A's share = ₹ $(200 - x)$

According to the question,

$2 \times (A\text{'s share}) = 3 \times (B\text{'s share}) - 200$

$\Rightarrow \qquad\qquad 2 \times (200 - x) = 3x - 200$

$\Rightarrow \qquad\qquad 400 - 2x = 3x - 200$

$\Rightarrow \qquad\qquad -2x - 3x = -200 - 400$

$\Rightarrow \qquad\qquad -5x = -600$

$\Rightarrow \qquad\qquad x = -600 \times \left(-\dfrac{1}{5}\right)$

$\therefore \qquad\qquad x = 120$

Hence, B's share is ₹ 120.

Question. 113 Madhulika thought of a number, doubled it and added 20 to it. On dividing the resulting number by 25, she gets 4. What is the number?

Solution.

Let the number be x.

According to the question,

$$\dfrac{2x + 20}{25} = 4$$

$\Rightarrow \qquad\qquad 2x + 20 = 25 \times 4$

$\Rightarrow \qquad\qquad 2x + 20 = 100$

$\Rightarrow \qquad\qquad 2x = 100 - 20$

$\Rightarrow \qquad\qquad 2x = 80$

$\Rightarrow \qquad\qquad x = \dfrac{80}{2}$

$\therefore \qquad\qquad x = 40$

Hence, the required number is 40.