Unit 4(Simple Equations)

Multiple Choice Questions (MCQs)

Question 1:

1 The solution of the equation $ax + b = 0$

(a) $\frac{a}{b}$ (b) $-b$ (c) $-\frac{b}{a}$ (d) $\frac{b}{a}$

Solution:

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

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

$\Rightarrow \quad x = -\frac{b}{a}$ [on dividing both sides by a]

Question 2:

If **a** and **b** are positive integers, then the solution of the equation **ax = b** will always be a

(a) positive number

(b) negative number

(c) 1

(d) 0

Solution:

(a) Given equation is ax = b

On dividing the equation by a, we get

$x = \frac{b}{a}$

Now, if a and b are positive integers, then the solution of the equation is also positive number as division of two positive integers is also a positive number.

Question 3:

Which of the following is not allowed in a given equation?

(a) Adding the same number to both sides of the equation.

(b) Subtracting the same number from both sides of the equation.

(c) Multiplying both sides of the equation by the same non-zero number.

(d) Dividing both sides of the equation by the same number.

Solution:

(d) Dividing both sides of the equation by the same non-zero number is allowed in a given

equation, division of any number by zero is not allowed as set division of number by zero is not defined.

Note If we add same number to both sides of the equation while adding subtracting, then there will be no change in the given equation.

Question 4:

The solution of which of the following equations is neither a positive fraction nor an integer?

(a) 2x + 6 = 0

(b) 3x – 5=0

(c) 5x – 8 = x + 4

(d) 4x + 7 = x + 2

Solution:

(d) Let us solve the equations:

(a) Given equation is $2x + 6 = 0$

$\Rightarrow \quad 2x = -6$ [transposing 6 to RHS]

$\Rightarrow \quad x = -\frac{6}{2}$ [dividing both sides by 2]

$\Rightarrow \quad x = -3$ (integer)

(b) Given equation is $3x - 5 = 0$

$\Rightarrow \quad 3x = 5$ [transposing 5 to RHS]

$\Rightarrow \quad k = \frac{5}{3}$ (fraction) [dividing both sides by 3]

(c) Given equation is $5x - 8 = x + 4$

$\Rightarrow \quad 5x = x + 4 + 8$ [transposing 8 to RHS]

$\Rightarrow \quad 5x = x + 12$

$\Rightarrow \quad 5x - x = 12$ [transposing x to LHS]

$\Rightarrow \quad 4x = 12$

$\Rightarrow \quad x = 3$ (integer) [dividing both sides by 4]

(d) Given equation is $4x + 7 = x + 2$

$\Rightarrow \quad 4x + 7 - x = 2$ [transposing x to LHS]

$\Rightarrow \quad 3x = 2 - 7$ [transposing 7 to RHS]

$\Rightarrow \quad 3x = -5$

$\Rightarrow \quad x = -\frac{5}{3}$ [dividing both sides by 3]

which is neither a positive fraction nor an integer.

Question 5:

The equation which can not be solved in integers is

(a) 5y — 3 = — 18

(b) 3x-9=0

(c) 3z + 8 = 3 + z

(d) 9y + 8 = 4y-7

Solution:

(c) Let us solve the equations:

(a) Given equation is $5y - 3 = -18$

$\Rightarrow \quad 5y = -18 + 3$ [transposing 3 to RHS]

$\Rightarrow \quad 5y = -15$

$\Rightarrow \quad y = -3$ (integer) [dividing both sides by 5]

(b) Given equation is $3x - 9 = 0$

$\Rightarrow \quad 3x = 9$ [transposing 9 to RHS]

$\Rightarrow \quad x = 3$ (integer) [dividing both sides by 3]

(c) Given equation is $3z + 8 = 3 + z$

On transposing z and 8 to LHS and RHS respectively, we get

$\Rightarrow \quad 3z - z = 3 - 8$

$\Rightarrow \quad 2z = -5$

$z = -\frac{5}{2}$ [dividing both sides by 2]

which is neither a positive fraction nor an integer.

(d) Given equation is $9y + 8 = 4y - 7$

On transposing $4y$ and 8 to LHS and RHS respectively, we get

$\Rightarrow \quad 9y - 4y = -7 - 8$

$5y = -15$

$\Rightarrow \quad \frac{5y}{5} = -\frac{15}{5}$ [dividing both sides by 5]

$\Rightarrow \quad y = -3$ (integer)

Question 6:

If $7x + 4 = 25$, then **x** is equal to

(a) $\frac{29}{7}$

(b) $\frac{100}{7}$

(c) 2

(d) 3

Solution:

(d) Given equation is $7x + 4 = 25$

$\Rightarrow \quad 7x = 25 - 4$ [transposing 4 to RHS]

$\Rightarrow \quad 7x = 21$

On dividing the above equation by 7, we get

$x = 3$

Hence, the solution of the given equation is 3.

Question 7:

The solution of the equation $3x + 7 = -20$ is

(a) $\frac{17}{7}$

(b) -9

(c) 9

(d) $\frac{13}{3}$

Solution:

(b) Given equation is $3x + 7 = -20$

$\Rightarrow \quad 3x = -20 - 7$ [transposing 7 to RHS]

$\Rightarrow \quad 3x = -27$

On dividing the above equation by 3, we get

$x = -9$

Hence, the solution of the given equation is -9.

Question 8:

The value of y for which the expressions (y -15) and (2y +1) become equal is

(a) 0 (b) 16 (0 8 (d)-16

Solution:

(d) It is given that both the expressions are equal. So, the equation is

$\Rightarrow \quad y - 15 = 2y + 1$

$\Rightarrow \quad y - 2y = 1 + 15$ [transposing $2y$ to LHS and (-15) to RHS]

$-y = 16$

Multiplying both sides by (-1), we get

$y = -16$

Question 9:

If k + 7 = 16, then the value of 8k – 72 is

(a) 0

(b) 1

(c) 112

(d) 56

Solution:

(a) Given equation is $k + 7 = 16$

On transposing 7 to RHS, we get

$k = 16 - 7 = 9$

Put the value of k in the equation $(8k - 72)$, we get

$8(9) - 72 = 72 - 72 = 0$

Question 10:

If 43m = 0.086, then the value of**m** is

(a) 0.002

(b) 0.02

(c) 0.2

(d) 2

Solution:

(a) Given equation is $43m = 0.086$

On dividing the given equation by 43, we get

$$m = \frac{0.086}{43}$$

If we remove the decimal, we get 1000 in denominator

$$m = \frac{86}{43} \times \frac{1}{1000} = \frac{2}{1000} = 0.002$$

Question 11:

x exceeds 3 by 7, can be represented as

(a) x + 3 = 2

(b) x + 7 = 3

(c) x – 3 = 7

(d) x – 7 = 3

Solution:

The given statement means x is 7 more than 3.

So, the equation is x – 7 = 3

We can also write it as x – 3 = 7.

Question 12:

The equation having 5 as a solution is

(a) 4x + 1 = 2

(b) 3 – x = 8

(c) x – 5 = 3

(d) 3 + x = 8

Solution:

(d) Let us solve the equations:

(a) Given equation is $4x + 1 = 2$

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

(b) Given equation is $3 - x = 8$

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

(c) Given equation is $x - 5 = 3$

$\Rightarrow \quad x = 3 + 5 \Rightarrow x = 8$

(d) Given equation is $3 + x = 8$

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

Question 13:

The equation having – 3 as solution is

(a) x + 3 = 1

(b) 8 + 2x = 3

(c) 10 + 3x = 1

(d) 2x + 1 = 3

Solution:

(c) Let us solve the equations:

(a) Given equation is $x + 3 = 1$

$\Rightarrow \quad x = 1 - 3$

$\Rightarrow \quad x = -2$

(b) Given equation is $8 + 2x = 3$

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

$\Rightarrow \quad 2x = -5$

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

(c) Given equation is $10 + 3x = 1$

$\Rightarrow \quad 3x = 1 - 10$

$\Rightarrow \quad 3x = -9$

$\Rightarrow \quad x = -3$

Now, we don't have to solve next equation as we get the answer.

Question 14:

Which of the following equations can be formed starting with x = 0?

(a) 2x + 1 = -1

(b) $\frac{x}{2}$+ 5=7

(c)3x-1 = -1

(d)3x-1=1

Solution:

(c) We have, $x = 0$

On multiplying both the sides by 3, we get

$$3 \times x = 3 \times 0$$

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

On adding (-1) both the sides, we get

$$3x + (-1) = 0 + (-1)$$

$$\Rightarrow \quad 3x - 1 = -1$$

Question 15:

Which of the following equations cannot be formed using the equation x -V.

(a) 2x + 1 = 15 (b) 7x -1 = 50 (c) x – 3 = 4 (d) $\frac{x}{7}$y-1=0

Solution:

(b) We have, $x = 7$

On multiplying both the sides by 7, we get

$$7 \times x = 7 \times 7 \quad \Rightarrow \quad 7x = 49$$

On adding (-1) both the sides, we get

$$7x + (-1) = 49 + (-1)$$

$$\Rightarrow \quad 7x - 1 = 49 - 1$$

$$\Rightarrow \quad 7x - 1 = 48$$

Question 16:

If $\frac{x}{2} = 3$, then the value of 3x + 2 is 2

(a) 20 (b) 11 (c) $\frac{13}{2}$ (d)8

Solution:

(a) Given, $\frac{x}{2} = 3$

On multiplying both sides by 2, we get $\frac{x}{2} \times 2 = 3 \times 2$

$$\Rightarrow \quad x = 3 \times 2 = 6$$

Put $x = 6$ in the equation $3x + 2$, we get

$$3(6) + 2 = 18 + 2 = 20$$

Question 17:

Which of the following numbers satisfy the equation – 6 + x = – 12 ?

(a) 2 (b) 6 (c) -6 (d) – 2

Solution:

(c) Let us put the values given in the options in equation $-6+x=-12$

(a) Put $x=2$

$\Rightarrow \quad -6+2=-12$

$\Rightarrow \quad -4=-12$

$\therefore \quad \text{LHS} \neq \text{RHS}$

(b) Put $x=6$

$\Rightarrow \quad -6+(6)=-12$

$\Rightarrow \quad 0=-12$

$\therefore \quad \text{LHS} \neq \text{RHS}$

(c) Put $x=-6$

$\Rightarrow \quad -6+(-6)=-12$

$\Rightarrow \quad -6-6=-12$

$\Rightarrow \quad -12=-12$

$\therefore \quad \text{LHS} = \text{RHS}$ (satisfied)

Now, there is no need to check the next option.

Hence, $x=-6$ satisfies the given equation.

Question 18:

Shifting one term from one side of an equation to another side with a change of sign is known as

(a) commutativity

(b) transposition

(c) distributivity

(d) associativity

Solution:

(b) Transposition means shifting one term from one side of an equation to another side with a change of sign.

Fill in the blanks

In questions 19 to 48 , fill in the blanks to make the statements true.

Question 19:

The sum of two numbers is 60 and their difference is 30.

(a) If smaller number is x, the other number is_____ .

(b) The difference of numbers in term of x is_____ .

(c) The equation formed is_____ .

(d) The solution of the equation is_____ .

(e) The numbers are_____ and_____ .

Solution:

Given, the sum of two numbers is 60 and difference is 30.

(a) If the smaller number is x, then the other number is (60- x), since the sum of both numbers is 60.

(b) Given, one number = x [from (a)]

Then, other number = (60 – x)

∴ Difference = (60 – x) – x = 60 – 2x

(c) We are given that difference between two numbers is 30.

So, the equation formed is $60 - 2x = 30$

$\Rightarrow \quad -2x = 30 - 60$ [transposing 60 to RHS]

$\Rightarrow \quad -2x = -30$

$\Rightarrow \quad \mathbf{2x = 30}$ [multiplying both sides by (– 1)]

(d) Let us solve the equation for x,

$$2x = 30$$

On dividing the above equation by 2, we get

$$\frac{2x}{2} = \frac{30}{2}$$

$$\Rightarrow \quad x = 15$$

Hence, the solution of the equation is **15.**

(e) The numbers are x and $(60 - x)$.

Now, put the value of x, we get

First number = **15**

Second number = 60 – 15 = **45**

Question 20:

Sum of two numbers is 81. One is twice the other_____.

(a) If smaller number is x, the other number is _

(b) The equation formed is_____ .

(c) The solution of the equation is_____ .

(d) The numbers are_____ and_____ .

Solution:

(a) We are given that one number is twice the other.

If smaller number is x, then the other number is 2x.

(b) We are given that sum of two numbers is 81. So, the equation will be

$$\mathbf{x + 2x = 81}$$

(c) Now, solve the equation for x,

$\Rightarrow \quad x + 2x = 81$

$\Rightarrow \quad 3x = 81$

$\Rightarrow \quad \frac{3x}{3} = \frac{81}{3}$ [dividing both sides by 3]

$$x = 27$$

Hence, the solution of the equation is **27**.

(d) The two numbers are $x = \mathbf{27}$ and $2x = 2 \times 27 = \mathbf{54}$.

Question 21:

In a test, Abha gets twice the marks as that of Palak. Two times Abha's marks and three times Palak's marks make 280.

(a) If Palak gets x marks, Abha gets_____.

(b) The equation formed is_____ .

(c) The solution of the equation is_____ .

(d) Marks obtained by Abha are_____ .

Solution:

(a) If Palak gets x marks, then Abha gets twice the marks as that of Palak, i.e. 2x,

(b) Two times of Abha's marks = 2 (2x) = Ax and three times the Palak marks = 3(x) = 3x

Now, two times Abha's marks and three times Palak's marks make 280.

So, the equation formed is 4x+ 3x= 280.

(c) Solve the equation for x,

$\Rightarrow \quad 4x + 3x = 280$

$\Rightarrow \quad 7x = 280$

$\Rightarrow \quad \frac{7x}{7} = \frac{280}{7}$ [dividing both sides by 7]

$x = 40$

Hence, the solution of the equation is **40**.

(d) Marks obtained by Abha are $2x$, i.e. $2 \times 40 = \mathbf{80}$.

Question 22:

The length of a rectangle is two times its breadth. Its perimeter is 60cm.

(a) If the breadth of rectangle is x cm, the length of the rectangle is_____ .

(b) Perimeter in terms of x is_____ .

(c) The equation formed is_____ .

(d) The solution of the equation is_____ .

Solution:

(a) It is given that the length of the rectangle is two times its breadth.

∴ Length = **2x cm**

(b) Perimeter of rectangle = 2 (Length + Breadth) = 2 (2x+ x)

(c) As we are given that perimeter of rectangle is 60 cm.

So, the equation formed is $2(2x + x) = 60$

$\Rightarrow \quad 2(3x) = 60$

$\Rightarrow \quad \mathbf{6x = 60}$

(d) On dividing the equation by 6, we get

$\frac{6x}{6} = \frac{60}{6}$

$\Rightarrow \quad x = 10$

Hence, the solution of the equation is **10**.

Question 23:

In a bag, there are Rs. 5 and Rs. 2 coins. If they are equal in number and their worth is Rs. 70, then

(a) The worth of x coins of Rs. 5 each_____ .

(b) The worth of x coins of Rs. 2 each_____ .

(c) The equation formed is_____ .

(d) There are_____ Rs. 5 coins and_____ Rs. 2 coins.

Solution:

Let number of coins of Rs. 5 = x

Then, number of coins of Rs. 2 = x

(a) Number of coins of Rs.5 = x

So, the worth of Rs. 5 of x coins = Rs.5 x x = Rs. 5x

(b) Similarly, the worth of 12 of x coins = Rs. 2x

Question 24:

In a Mathematics quiz, 30 prizes consisting of 1st and 2nd prizes only are to be given. 1st and 2nd prizes are worth ? 2000 and ? 1000, respectively. If the total prize money is Rs. 52000, then show that

(a) If 1st prizes are x in number the number of 2nd prizes are_____ .

(b) The total value of prizes in terms of x are_____ .

(c) The equation formed is_____ .

(d) The solution of the equation is_____ .

(e) The number of 1st prizes are_____ and the number of 2nd prizes are_____ .

Solution:

Given, number of prizes = 30

Total prize money = Rs. 52000, 1st and 2nd prizes are worth Rs. 2000 and Rs. 1000, respectively.

(a) 1st prizes are x in number, the number of 2nd prizes are **(30-x)**, because total number of prizes are 30.

(b)Total value of prizes in terms of x are **2000x+ 1000 (30- x).**

(c) The equation formed is $1000x + 30000 = 52000$

From (b), $2000x + 1000(30 - x) = 52000$

$\Rightarrow \quad 2000x + 30000 - 1000x = 54000$

$\Rightarrow \quad \mathbf{1000x + 30000 = 52000}$

(d) The solution of the equation is **22**.

From (c), $1000x + 30000 = 52000$

$\Rightarrow \quad 1000x = 52000 - 30000 = 22000$

$\Rightarrow \quad x = \frac{22000}{1000} = 22$

(e) The number of 1st prizes are **22** and the number of 2nd prizes are **8**.

From (b), $2000x + 1000(30 - x) = 52000$

$2x + (30 - x) = 52$ [dividing both sides by 1000]

$x + 30 = 52$

$\Rightarrow \quad x = 52 - 30 = 22$

$\therefore \quad$ Number of 2nd prizes $= 30 - 22 = 8$

Question 25:

If **z** + 3 = 5, then**z** = _____ .

Solution:

Solve the given equation for z,

$z + 3 = 5$

$\Rightarrow \quad z = 5 - 3$ [transposing 3 to RHS]

$\Rightarrow \quad \mathbf{z = 2}$

Question 26:

_____ is the solution of the equation 3x – 2 = 7.

Solution:

Solve the given equation for x,

$3x - 2 = 7$

$\Rightarrow \quad 3x = 7 + 2$ [transposing (– 2) to RHS]

$\Rightarrow \quad 3x = 9$

$\Rightarrow \quad \frac{3x}{3} = \frac{9}{3}$ [dividing both sides by 3]

$\Rightarrow \quad \mathbf{x = 3}$

Question 27:

_____ is the solution of 3x +10 = 7.

Solution:

Solve the given equation for x,

$\Rightarrow \quad 3x + 10 = 7$

$\Rightarrow \quad 3x = 7 - 10$ [transposing 10 to RHS]

$\Rightarrow \quad 3x = -3$

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

$x = -1$

Question 28:

If **2x** + 3 = 5, then value of 3x + 2 is.

Solution:

Solve the given equation for x,

$$2x + 3 = 5$$

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

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

$\Rightarrow$ $x = 1$

Put the value of x in $(3x + 2)$, we get

$$3(1) + 2 = 3 + 2 = \mathbf{5}$$

Question 29:

In integers, 4x – 1 = 8 has_____ solution.

Solution:

Solve the given equation for x,

$$4x - 1 = 8$$

$\Rightarrow$ $4x = 8 + 1$ [transposing (– 1) to RHS]

$\Rightarrow$ $4x = 9$

$\Rightarrow$ $\frac{4x}{4} = \frac{9}{4}$ [dividing both sides by 4]

$\Rightarrow$ $x = \frac{9}{4}$

Since, the solution of the equation is not an integer, hence the equation has **no** solution.

Question 30:

In natural numbers, 4x + 5 = – 7 has _____ solution.

Solution:

Solve the equation for x, $4x + 5 = -7$

$\Rightarrow$ $4x = -7 - 5$ [transposing 5 to RHS]

$\Rightarrow$ $4x = -12$

$\Rightarrow$ $x = -3$ [dividing both sides by 3]

Since, the value of x is not natural number, hence the equation has **no** solution in natural numbers.

Question 31:

In natural numbers, **x –** 5 = – 5 has_____ solution.

Solution:

Solve the given equation for x.

$$x - 5 = -5$$

$\Rightarrow$ $x = -5 + 5$ [transposing (– 5) to RHS]

$\Rightarrow$ $x = 0$

Since, natural numbers do not contain zero, hence the equation has **no** solution.

Question 32:

In whole numbers, **x** + 8 = 12 – 4 has solution.

Solution:

Solve the given equation for x,

$$x + 8 = 12 - 4$$

$\Rightarrow$ $x + 8 = 8$

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

$\Rightarrow$ $x = 0$

Since, zero is in the range of whole numbers, hence the equation has **one** solution.

Question 33:

If 5 is addes to three times a number, it becomes the same as 7 is subtracted from four times the same number. This fact can be represented as _____.

Solution:

Let the number be x.

Now, 5 is added to 3 times the number 5 + 3x.

It is same as 7 is subtracted from 4 times the number, i.e. Ax – 7.

So, the equation formed is **5+ 3x= 4x- 7**.

Question 34:

x + 7 = 10 has the solution _____.

Solution:

Solve the given equation for x,

$$x + 7 = 10$$

$\Rightarrow$ $x = 10 - 7$ [transposing 7 to RHS]

$\Rightarrow$ $x = \mathbf{3}$

Question 35:

x – 0 = _____ when 3x=12.

Solution:

Given that, $3x = 12$

$\Rightarrow$ $\frac{3x}{3} = \frac{12}{3}$ [dividing both sides by 3]

$\Rightarrow$ $x = 4$

$\therefore$ $x - 0 = 4 - 0 = \mathbf{4}$

Question 36:

x – 1 = _____ when 2x=2.

Solution:

Given that, $2x = 2$

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

$\Rightarrow$ $x = 1$

$\therefore$ $x - 1 = 1 - 1 = \mathbf{0}$

Question 37:

x – _____ =15; when $\frac{x}{2} = 6$

Solution:

Given that, $\frac{x}{2} = 6$

$\Rightarrow$ $x = 12$ [multiplying both sides by 2]

$\therefore$ $12 - (-3) = 15$

Hence, $x - \mathbf{(-3)} = 15$

Question 38:

The solution of the equation x + 15 = 19 is.

Solution:

Solve the equation for x,

$\Rightarrow \quad x + 15 = 19$

$\Rightarrow \quad x = 19 - 15$ [transposing 15 to RHS]

$x = 4$

Hence, the solution of the given equation is **4.**

Question 39:

Finding the value of a variable in a linear equation that_____ the equation is called a_____ of the equation.

Solution:

Finding the value of a variable in a linear equation that **satisfies** the equation is called a **root** of the equation.

Question 40:

Any term of an equation may be transposed from one side of the equation to the other side of the equation by changing the _____ of the term.

Solution:

Any term of an equation may be transposed from one side of the equation to the other side of the equation by changing the **sign** of the term.

Question 41:

If $\frac{9}{5}x = \frac{18}{5}$, then $x =$ _____ .

Solution:

Given that, $\frac{9}{5}x = \frac{18}{5}$

On dividing both sides by $\frac{9}{5}$, we get

$\frac{9}{5}x \div \frac{9}{5} = \frac{18}{5} \div \frac{9}{5}$

$\Rightarrow \quad x = \frac{18}{5} \times \frac{5}{9} = \mathbf{2}$

Question 42:

If 3 – x =-4, then **x =** ___.

Solution:

Given that, $3 - x = -4$

$\Rightarrow \quad -x = -4 - 3$ [transposing 3 to RHS]

$\Rightarrow \quad -x = -7$

$\Rightarrow \quad x = \mathbf{7}$ [multiplying both sides by (– 1)]

Question 43:

If $x - \frac{1}{2} = -\frac{1}{2}$, then $x =$ _____ .

Solution:

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

$\Rightarrow$ $x = \frac{1}{2} - \frac{1}{2}$ [transposing $(-\frac{1}{2})$ to RHS]

$\Rightarrow$ $x = \mathbf{0}$

Question 44:

If $\frac{1}{6} - x = -\frac{1}{6}$, then $x =$ _____ .

Solution:

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

$\Rightarrow$ $-x = \frac{1}{6} - \frac{1}{6}$ [transposing $\frac{1}{6}$ to RHS]

$\Rightarrow$ $-x = 0$

$\Rightarrow$ $x = \mathbf{0}$ [multiplying both sides by (– 1)]

Question 45:

If 10 less than a number is 65, then the number is_____.

Solution:

Let the number be x.

Then, the equation will be x – 10 = 65

Now, solving the equation for x,

$x = 65 + 10$ [transposing (– 10) to RHS]

$\Rightarrow$ $x = \mathbf{75}$

Hence, the number is **75.**

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Question 46:

If a number is increased by 20, it becomes 45. Then, the number is _____.

Solution:

Let the number be x.

If it is increased by 20, it becomes (x + 20),

So, the equation formed is $x + 20 = 45$

$\Rightarrow$ $x = 45 - 20$ [transposing 20 to RHS]

$\Rightarrow$ $x = 25$

Hence, the number is **25**.

Question 47:

If 84 exceeds another number by 12, then the other number is_____.

Solution:

$\Rightarrow$ $84 - x = 12$

$\Rightarrow$ $-x = 12 - 84$ [transposing 84 to RHS]

$\Rightarrow$ $-x = -72$

$x = 72$ [multiplying both sides by (– 1)]

Hence, the number is **72**.

Question 48:

If $x - \frac{7}{8} = \frac{7}{8}$, then $x =$ _____.

Solution:

True / False

In questions 49 to 55, state whether the statements are True or False.

Given equation is $x - \frac{7}{8} = \frac{7}{8}$

$x = \frac{7}{8} + \frac{7}{8}$ [transposing $\left(-\frac{7}{8}\right)$ to RHS]

$x = \frac{7+7}{8}$ [taking LCM]

$x = \frac{14}{8} = \frac{7}{4}$

Question 49:

5 is the solution of the equation 3x + 2 = 17.

Solution:

True

Solve the equation for x, $3x + 2 = 17$

$\Rightarrow$ $3x = 17 - 2$ [transposing 2 to RHS]

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

$\Rightarrow$ $x = 5$

Question 50:

$\frac{9}{5}$ is the solution of the equation 4x – 1 = 8.

Solution:

False

Solve the equation for x,

$\Rightarrow$ $4x - 1 = 8$

$\Rightarrow$ $4x = 8 + 1$ [transposing (– 1) to RHS]

$\Rightarrow$ $4x = 9$

$x = \frac{9}{4}$ [dividing both sides by 4]

Question 51:

4x – 5 = 7 does not have an integer as its solution.

Solution:

False

Given equation is $4x - 5 = 7$

$\Rightarrow$ $4x = 7 + 5$ [transposing (– 5) to RHS]

$\Rightarrow$ $4x = 12$

On dividing both sides by 4, we get

$x = 3$ (integer)

Question 52:

One-third of a number added to itself gives 10, can be represented as $\frac{x}{3}$ + 10 = x.

Solution:

False

Let the number be x.

Then, the equation formed is $\frac{x}{3}$+ x = 10

Question 53:

$\frac{3}{2}$ is the solution of the equation 8x – 5 = 7.

Solution:

True

Solve the equation for x,

$$\Rightarrow \quad 8x - 5 = 7$$

$$\Rightarrow \quad 8x = 7 + 5 \qquad \text{[transposing (– 5) to RHS]}$$

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

$$\Rightarrow \quad \frac{8x}{8} = \frac{12}{8} \qquad \text{[dividing both sides by 8]}$$

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

Question 54:

If 4x – 7 = 11, then x = 4.

Solution:

False

Solve the equation for x,

$$\Rightarrow \quad 4x - 7 = 11$$

$$\Rightarrow \quad 4x = 11 + 7 \qquad \text{[transposing (– 7) to RHS]}$$

$$\Rightarrow \quad 4x = 18$$

$$\Rightarrow \quad \frac{4x}{4} = \frac{18}{4} \qquad \text{[dividing both sides by 4]}$$

$$x = \frac{9}{2}$$

Question 55:

If 9 is the solution of variable x in the equation $\frac{5x-7}{2}$ = y, then the value of y is 28.

Solution:

False

Given that, $x = 9$

Put the value of x in the equation, we get

$$\frac{5(9) - 7}{2} = y$$

$$\Rightarrow \quad \frac{45 - 7}{2} = y$$

$$\Rightarrow \quad \frac{38}{2} = y$$

$$\Rightarrow \quad y = 19$$

Question 56:

Match each of the entries in Column I with the appropriate entries in Column II.

	Column I		Column II
(i)	$x+5=9$	(a)	$-\frac{5}{3}$
(ii)	$x-7=4$	(b)	$\frac{5}{3}$
(iii)	$\frac{x}{12}=-5$	(c)	4
(iv)	$5x=30$	(d)	6
(v)	The value of y which satisfies $3y=5$	(e)	11
(vi)	If $p=2$, then the value of $\frac{1}{3}(1-3p)$	(f)	-60
		(g)	3

Solution:

(i) →(c) Given equation is $x + 5 = 9$

$\Rightarrow x = 9 - 5$ [transposing 5 to RHS]

$\Rightarrow x = 4$

(ii) →(e) Given equation is $x - 7 = 4$

$\Rightarrow x = 4 + 7$ [transposing (– 7) to RHS]

$\Rightarrow x = 11$

(iii) →(f) Given equation is $\frac{x}{12} = -5$

$\Rightarrow 12 \times \frac{x}{12} = -5 \times 12$ [multiplying both sides by 12]

$\Rightarrow x = -60$

(iv) →(d) Given equation is $5x = 30$

$\Rightarrow \frac{5x}{5} = \frac{30}{5}$ [dividing both sides by 5]

$\Rightarrow x = 6$

(v) →(b) Given equation is $3y = 5$

$\Rightarrow \frac{3y}{3} = \frac{5}{3}$ [dividing both sides by 3]

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

(vi) →(a) Given, $p = 2$

Put the value of p in the equation $= \frac{1}{3} \times (1 - 3p)$, we get

$$= \frac{1}{3}(1 - 3 \times 2) = \frac{1}{3} \times (1 - 6)$$

$$= \frac{1}{3} \times (-5)$$

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

In questions from 57 to 67, express each of the given statements as an equation.

Question 57:

13 subtracted from twice of a number gives 3.

Solution:

Let the number be x.

13 is subtracted from twice of a number i.e, 2x -13 and it results 3.

So, the equation formed is 2x -13 = 3

Question 58:

One-fifth of a number is 5 less than that number,

Solution:

Let the number be x.

Then, $\frac{1}{5}$th of the number $= \frac{x}{5}$

Now, $\frac{x}{5}$ is 5 less than x.

So, the equation formed is $\frac{x}{5} = x - 5$.

Question 59:

A number is 7 more than one-third of itself.

Solution:

Let the number be x.

Then, $\frac{1}{3}$ rd of number $= \frac{x}{3}$

So, the equation formed is $x = 7 + \frac{x}{3}$.

Question 60:

Six times a number is 10 more than the number.

Solution:

Let the number be x.

Then, 6 times of a number = 6x

So, the equation formed is 6x = 10 + x

Question 61:

If 10 is subtracted from half of a number, the result is 4.

Solution:

Let the number be x.

Then, 10 is subtracted from $\frac{x}{2}$ i.e. $\frac{x}{2} - 10$ and its results 4.

So, the equation formed is $\frac{x}{2} - 10 = 4$.

Question 62:

Subtracting 5 from **p,** the result is 2.

Solution:

Subtract 5 from p i.e. p – 5 and its results 2. Hence, the equation formed is p – 5 = 2.

Question 63:

Five times a number increased by 7 is 27.

Solution:

Let the number be x. Then, five times of number be 5x.

Since, it is increased by 7 i.e. 5x + 7 and it gives result 27.

Hence, the equation formed is 5x + 7 = 27

Question 64:

Mohan is 3 years older than Sohan. The sum of their ages is 43 years.

Solution:

Let age of Sohan be x yr. Then, the age of Mohan is (x + 3)yr.

∴ Sum of their ages = 43

So, the equation formed is x + {x + 3) = 43

Question 65:

If 1 is subtracted from a number and the difference is multiplied by ½ the result is 7.

Solution:

Let the number be x.

Then, 1 is subtracted from a number and the difference is multiplied by $\frac{1}{2}$ i.e $\frac{1}{2}(x-1)$

It gives result 7.

So, the equation formed is $\frac{1}{2}(x-1)=7$

Question 66:

A number divided by 2 and then increased by 5 is 9.

Solution:

Let the number be x.

Then, x is divided by 2 and increased by 5, i.e. $\frac{x}{2}+5$ and gives result 9.

So, the equation formed is $\frac{x}{2}+5=9$

Question 67:

The sum of twice a number and 4 is 18.

Solution:

Let the number be x.

Then, sum of twice of a number and 4 gives result 18. Hence, 2x + 4 = 18 is the equation.

Question 68:

The age of Sohan Lai is four times that of his son Amit. If the difference of their ages is 27 years, find the age of Amit.

Solution:

Let x yr be the age of Amit.

Then, age of Sohan Lal = $4x$ yr

According to the question,

$$4x - x = 27 \Rightarrow 3x = 27 \Rightarrow x = \frac{27}{3} = 9$$

Hence, the age of Amit is 9 yr.

Question 69:

A number exceeds the other number by 12. If their sum is 72, find the numbers.

Solution:

Let x be a number, then another number will be $x + 12$.

According to the question, $x + x + 12 = 72$

$\Rightarrow$ $2x = 72 - 12$ [transposing 12 to RHS]

$\Rightarrow$ $2x = 60$

$\Rightarrow$ $x = 30$ [dividing both sides by 2]

Hence, the numbers are 30 and (30 + 12) i.e. 30 and 42.

Question 70:

Seven times a number is 12 less than thirteen times the same number. Find the number.

Solution:

Let the number be x.

Then, seven times of this number = $7x$ and thirteen times of this number = $13x$.

According to the question,

$\Rightarrow 13x - 7x = 12$

$\Rightarrow 6x = 12$

$\Rightarrow x = 2$ [dividing both sides by 6]

Hence, the required number is 2.

Question 71:

The interest received by Karim is Rs. 30 more than that of Ramesh. If the total interest received by them is Rs. 70, find the interest received by Ramesh

Solution:

Let the interest received by Karim be ₹x, then interest received by Ramesh will be ₹ $(x - 30)$. So, the interest received by both will be ₹ $(x + x - 30)$.

According to the question, $x + x - 30 = 70$

$\Rightarrow 2x = 70 + 30$ [transposing (– 30) to RHS]

$\Rightarrow 2x = 100$

$\Rightarrow x =$ ₹ 50 [dividing both sides by 2]

So, the interest received by Ramesh = ₹ $(x - 30)$ = ₹ $(50 - 30)$ = ₹ 20

Question 72:

Subramaniam and Naidu donate some money in a Relief Fund. The amount paid by Naidu is Rs. 125 more than that of Subramaniam. If the total money paid by them is Rs. 975, find the amount of money donated by Subramaniam.

Solution:

Let ₹ x be the amount donated in a Relief fund by Subramaniam.Then, the amount donated by Naidu will be ₹ $(x + 125)$.

According to the question,

$x + x + 125 = 975$

$\Rightarrow 2x = 975 - 125$ [transposing 125 to RHS]

$\Rightarrow 2x = 850$

$\Rightarrow x =$ ₹ 425 [dividing both sides by 2]

Hence, the amount of money donated by Subramaniam is ₹ 425.

Question 73:

In a school, the number of girls is 50 more than the number of boys. The total number of students is 1070. Find the number of girls.

Solution:

Let x be the number of boys in the school. Then, the number of girls in the school will be $x + 50$.

According to the question,

$x + (x + 50) = 1070$

$\Rightarrow 2x + 50 = 1070$

$\Rightarrow 2x = 1070 - 50$ [transposing 50 to RHS]

$\Rightarrow 2x = 1020$

$\Rightarrow x = 510$ [dividing both sides by 2]

So, the number of boys in the school = 510

$\therefore$ Number of girls in the school = 510 + 50 = 560

Question 74:

Two times a number increased by 5 equals 9. Find the number.

Solution:

Let the number be x.

It is given that two times this number increased by 5 equals 9.

$\therefore \quad 2x + 5 = 9$

$\Rightarrow \quad 2x = 9 - 5$

$\Rightarrow \quad 2x = 4$

$\Rightarrow \quad x = 2$ [dividing both sides by 2]

Hence, the required number is 2.

;

Question 75:

9 added to twice a number gives 13. Find the number.

Solution:

Let the required number be x.

It is given that 9 added to twice this number gives 13.

$\therefore \quad 2x + 9 = 13$

$\Rightarrow \quad 2x = 13 - 9$ [transposing 9 to RHS]

$\Rightarrow \quad 2x = 4$

$\Rightarrow \quad \frac{2x}{2} = \frac{4}{2}$ [dividing both sides by 2]

$\Rightarrow \quad x = 2$

Hence, the required number is 2.

Question 76:

1 subtracted from one-third of a number gives 1. Find the number.

Solution:

Let the number be x. Then, one-third of the number $= \frac{1}{3}x$.

According to the question,

$\frac{1}{3}x - 1 = 1$

$\Rightarrow \quad \frac{1}{3}x = 1 + 1$ [transposing (-1) to RHS]

$\Rightarrow \quad \frac{1}{3}x = 2$

$\Rightarrow \quad x = 3 \times 2$ [multiplying both sides by 3]

$\Rightarrow \quad x = 6$

Hence, the required number is 6.

Question 77:

After 25 years, Rama will be 5 times as old as he is now. Find his present age.

Solution:

Let Rama's present age be x yr.

Then, Rama's age after 25 yr = $(x + 25)$ yr

It is given that after 25 yr, Rama's age will be 5 times his present age.

Therefore, the equation is

$$x + 25 = 5x$$

$$\Rightarrow \quad 25 = 5x - x \qquad \text{[transposing } x \text{ to RHS]}$$

$$\Rightarrow \quad 25 = 4x$$

$$\Rightarrow \quad \frac{25}{4} = \frac{4x}{4} \qquad \text{[dividing both sides by 4]}$$

$$\Rightarrow \quad 6\frac{1}{4} = x$$

Hence, the present age of Rama is $6\frac{1}{4}$ yr.

Question 78:

After 25 years, Manoj will be 5 times as old as he is now. Find his present age.

Solution:

Let the present age of Manoj be x yr.

Then, Manoj's age after 20 yr = $(x + 20)$ yr

It is given that after 20 yr, Manoj's age will be 5 times his present age.

Therefore, the equation is

$$x + 20 = 5x$$

$$\Rightarrow \quad 20 = 5x - x \qquad \text{[transposing } x \text{ to RHS]}$$

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

$$\Rightarrow \quad 5 = x$$

Hence, the present age of Manoj is 5 yr.

Question 79:

My younger sister's age today is 3 times what it will be 3 years from now minus 3 times what her age was 3 years ago. Find her present age.

Solution:

Let the age of my younger sister be x yr.

Then, her age after 3 yr = $(x + 3)$ yr

Also, her age 3 yr ago = $(x - 3)$ yr

It is given that her present age is 3 times her age after 3 yr minus 3 times her age 3 yr ago.

Therefore, we obtain the following equation

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

$$\Rightarrow \quad x = 3x + 9 - 3x + 9 \qquad \text{[using the distributive property]}$$

$$\Rightarrow \quad x = 18 \text{ yr}$$

Hence, her present age is 18 yr.

Question 80:

If 45 is added to half a number, the result is triple the number. Find the number.

Solution:

Let x be the number. Then, half of the number is $\frac{x}{2}$.

According to the question,

$$\frac{x}{2} + 45 = 3x \Rightarrow \frac{x + 90}{2} = 3x$$

$$\Rightarrow x + 90 = 6x \Rightarrow x = \frac{90}{5} = 18$$

Hence, the number is 18.

Question 81:

In a family, the consumption of wheat is 4 times that of rice. The total consumption of the two cereals is 80 kg. Find the quantities of rice and wheat consumed in the family.

Solution:

As per the given information in the question, total consumption of the two cereals = 80 kg
Let x be the consumption of rice.

Then, consumption of wheat = $4x$

According to the question,

$$x + 4x = 80$$

$$\Rightarrow 5x = 80$$

$$\Rightarrow x = \frac{80}{5} = 16\,\text{kg}$$

$\therefore$ Consumption of wheat = $4x = 4 \times 16 = 64$kg

Hence, the consumption of rice and wheat are 16 kg and 64 kg, respectively.

Question 82:

In a bag, the number of one rupee coins is three times the number of two rupees coins. If the worth of he coins is ? 120, find the number of 1 rupee coins.

Solution:

Let the number of two rupee coins be y. Then, the number of one rupee coins is $3y$.
Total money by two rupee coins = $2 \times y = 2y$

Total money by one rupee coin = $1 \times 3y = 3y$

Total worth of coins = ₹ 120

So, the equation formed is

$$2y + 3y = 120 \quad \text{[given]}$$

$$\Rightarrow 5y = 120$$

$$\frac{5y}{5} = \frac{120}{5} \quad \text{[dividing both sides by 5]}$$

$$\Rightarrow y = 24$$

$\therefore$ Number of two rupee coins = $y = 24$ and number of one rupee coins = $3y = 3 \times 24 = 72$

Question 83:

Anamika thought of a number. She multiplied it by 2, added 5 to the product and obtained 17 as the result. What is the number she has thought of?

Solution:

Let x be the number thought by Anamika.
If she multiplied it be 2, then the number will be $2x$.
Also, added 5 to it and obtained 17 as the result.

$\therefore \quad 2x + 5 = 17$

$\Rightarrow \quad 2x = 17 - 5$ [transposing 5 to RHS]

$\Rightarrow \quad x = \frac{12}{2} = 6$

Hence, the number 6 is thought by Anamika.

Question 84:

One of the two numbers is twice the other. The sum of the numbers is 12. Find the numbers.

Solution:

Le x be the one of the number. Then, other number is twice the first one $= 2x$
According to the question,

$x + 2x = 12$

$\Rightarrow \quad 3x = 12$

$\Rightarrow \quad \frac{3x}{3} = \frac{12}{3}$ [dividing both sides by 3]

$\Rightarrow \quad x = 4$

Hence, the numbers are $x = 4$ and $2x = 2 \times 4 = 8$.

Question 85:

The sum of three consecutive integers is 5 more than the smallest of the integers. Find the integers.

Solution:

Let one number be x. Then, the next two consecutive numbers will be x + 1 and x + 2. Sum of these three numbers = x + (x + 1) + (x + 2) = 3x + 3

According to the question, $3x + 3 = x + 5$

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

$\Rightarrow \quad 2x = 2$

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

$\Rightarrow \quad x = 1$

$\therefore$ Hence, the numbers are 1, 1 + 1, 1 + 2 i.e, 1, 2, 3.

Question 86:

A number when divided by 6 gives the quotient 6. What is the number?

Solution:

Let the required number be x. Then, x divided by $6 = \frac{x}{6}$.
It is given that when is x is divided by 6, gives the quotient as 6.
So, we obtain the following equation

$\frac{x}{6} = 6$

$\Rightarrow \quad \frac{x}{6} \times 6 = 6 \times 6$ [multiplying both sides by 6]

$\Rightarrow \quad x = 36$

Hence, the required number is 36.

Question 87:

The perimeter of a rectangle is 40 m. The length of the rectangle is 4 m less than 5 times its breadth. Find the length of the rectangle.

Solution:

As per the given information in the question, the perimeter of a rectangle is 40 m.

[∵ perimeter of rectangle = 2 (length + breadth)]

Let x be the breadth of the rectangle.

Then, length of the rectangle = $5x - 4$

According to the question, $2x + 2(5x - 4) = 40$

$\Rightarrow 2x + 10x - 8 = 40$

$\Rightarrow 12x = 48$

$\Rightarrow x = 4$

Hence, length of the rectangle = $5x - 4 = (5 \times 4) - 4 = 20 - 4 = 16$ m.

Question 88:

Each of the 2 equal sides of an isosceles triangle is twice as large as the third side. If the perimeter of the triangle is 30 cm, find the length of each side of the triangle.

Solution:

Let third side of an isosceles triangle be x. Then, two other equal sides are twice.

So, the both equal sides are 2x and 2x.

We know that, perimeter of a triangle is sum of all sides of the triangle.

According to the question,

$$x + 2x + 2x = 30 \Rightarrow 5x = 30$$

On dividing both sides by 5, we get

$$\frac{5x}{5} = \frac{30}{5} \Rightarrow x = 6\,\text{cm}$$

$\therefore$ Third side = $x = 6$ cm

So, the other equal sides are $2x = 2 \times 6 = 12$ cm and $2x = 2 \times 6 = 12$ cm.

Question 89:

The sum of two consecutive multiples of 2 is 18. Find the numbers.

Solution:

Let the two consecutive multiples of 2 be $2x$ and $2x + 2$.

According to the question,

$$2x + 2x + 2 = 18$$

$\Rightarrow 4x + 2 = 18$

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

$\Rightarrow 4x = 16$

$\Rightarrow \frac{4x}{4} = \frac{16}{4}$ [dividing both sides by 4]

$\Rightarrow x = 4$

Hence, the required numbers are $2x = 2 \times 4 = 8$ and $2x + 2 = 2 \times 4 + 2 = 10$.

Question 90:

Two complementary angles differ by 20°. Find the angles.

Solution:

Let one of the angle be x, then other will be $x - 20$.

According to the question,

$$x + (x - 20) = 90° \quad [\because \text{sum of complementary angles is } 90°]$$

$$\Rightarrow \quad x + x - 20 = 90°$$

$$\Rightarrow \quad 2x - 20 = 90°$$

$$\Rightarrow \quad 2x = 90 + 20 \quad [\text{transposing } (-20) \text{ to RHS}]$$

$$\Rightarrow \quad 2x = 110°$$

$$\Rightarrow \quad \frac{2x}{2} = \frac{110°}{2} \quad [\text{dividing both sides by 2}]$$

$$\Rightarrow \quad x = 55°$$

Hence, the required angles are 55° and (55 – 20)° i.e. 55° and 35°.

Question 91:

150 has been divided into two parts such that twice the first part is equal to the second part. Find the parts.

Solution:

Let one part be x, then other part will be 2x as second part is twice the first part.

Since, 150 has been divided into above two parts.

According to the question,

$$x + 2x = 150$$

$$\Rightarrow \quad 3x = 150$$

$$\Rightarrow \quad \frac{3x}{3} = \frac{150}{3} \quad [\text{dividing both sides by 3}]$$

$$\Rightarrow \quad x = 50$$

Hence, the first part is 50 and the second part is $2 \times 50 = 100$.

Question 92:

In a class of 60 students, the number of girls is one third the number of boys. Find the number of girls and boys in the class.

Solution:

As per the given information in the question, the total number of students in the class = 60.

Let x be the number of boys in the class.

Then, the number of girls in the class = $\frac{x}{3}$

According to the question,

$$x + \frac{x}{3} = 60$$

$$\Rightarrow \quad \frac{3x + x}{3} = 60$$

$$\frac{4x}{3} = 60$$

$$\Rightarrow \quad 4x = 60 \times 3$$

$$\Rightarrow \quad 4x = 180$$

$$\Rightarrow \quad x = \frac{180}{4} = 45$$

Hence, the number of boys in the class is 45 and the number of girls in the class is $\frac{45}{3}$ i.e. 15.

Question 93:

Two-third of a number is greater than one-third of the number by 3. Find the number.

Solution:

Let the number be x.

Then, two-third of this number $= \frac{2}{3}x$ and one-third of this number $= \frac{1}{3}x$.

According to the question,

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

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

$$\Rightarrow \quad \frac{2x - x}{3} = 3 \qquad \text{[taking LCM on LHS]}$$

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

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

$$\Rightarrow \quad x = 9$$

Hence, the required number is 9.

Question 94:

A number is as much greater than 27 as it is less than 73. Find the number.

Solution:

Let the number be x. If we subtract 27 from x i.e. $(x - 27)$ and subtract x from 73 i.e. $(73 - x)$, we get the same result. Therefore,we get the following equation

$$x - 27 = 73 - x$$

$$\Rightarrow \quad x + x = 73 + 27$$

[transposing(–27) to RHS and $(-x)$ to LHS]

$$\Rightarrow \quad 2x = 100$$

$$\Rightarrow \quad \frac{2x}{2} = \frac{100}{2} \qquad \text{[dividing both sides by 2]}$$

$$\Rightarrow \quad x = 50$$

Hence, the required number is 50.

Question 95:

A man travelled two fifth of his journey by train, one third by bus. One-fourth by car and the remaining 3 km on foot. What is the length of his total journey?

Solution:

Let his total journey length be x.

$\therefore$ Then, travelled by train $= \frac{2}{5}x$,

Travelled by bus $= \frac{1}{3}x$ and travelled by car $= \frac{1}{4}x$

$\therefore$ Total journey travelled by train, bus and car $= \frac{2}{5}x + \frac{1}{3}x + \frac{1}{4}x$

$$= \frac{12 \times 2x + 20 \times x + 15 \times x}{60}$$

[$\because$ LCM of 5, 3 and 4 = 60]

$$= \frac{24x + 20x + 15x}{60} = \frac{59x}{60}$$

$\therefore$ Remaining journey $= \frac{x}{1} - \frac{59x}{60} = \frac{60x - 59x}{60} = \frac{x}{60}$

According to the question, remaining journey is 3 km.

$$\therefore \quad \frac{x}{60} = 3$$

$$\Rightarrow \quad x = 3 \times 60 = 180 \text{ km} \qquad \text{[by cross-multiplication]}$$

Hence, the length of his total journey is 180 km.

Question 96:

Twice' a number added to half of itself equals 24. Find the number.

Solution:

Let the number be x. Then, twice of this number $= 2x$ and half of this number $= \frac{1}{2}x$.

According to the question, $2x + \frac{1}{2}x = 24$

Multiplying both sides by 2, we get $4x + x = 48$

$\Rightarrow 5x = 48$

$\frac{5x}{5} = \frac{48}{5}$ [dividing both sides by 5]

$\Rightarrow x = 9.6$

Hence, the required number is 9.6.

Question 97:

Thrice a number decreased by 5 exceeds twice the number by 1. Find the number.

Solution:

Let the number be x. Then, thrice of this number $= 3x$ and twice of this number $= 2x$.
If we decrease thrice of x by 5, we get $(3x - 5)$.
According to the question,

$(3x - 5) - (2x) = 1$

$\Rightarrow 3x - 5 - 2x = 1$

$\Rightarrow x - 5 = 1$

$\Rightarrow x = 1 + 5$ [transposing (-5) to RHS]

$\Rightarrow x = 6$

Hence, the required number is 6.

Question 98:

A girl is 28 years younger than her father. The sum of their ages is 50 years. Find the ages of the girl and her father.

Solution:

Let x be the age of the girl.
Then, age of her father $= (x + 28)$ yr
According to the question,

$\therefore x + (x + 28) = 50$

$\Rightarrow 2x + 28 = 50$

$\Rightarrow 2x = 50 - 28$

$\Rightarrow 2x = 22$

$\Rightarrow x = \frac{22}{2} = 11$ yr

Hence, the age of the girl is 11 yr and age of her father's age is $(11 + 28)$, i.e. 39 yr.

Question 99:

The length of a rectangle is two times its width. The perimeter of the rectangle is 180 cm. Find the dimensions of the rectangle.

Solution:

Let x be the width of the rectangle. Then, length of the rectangle will be $2x$.
$\because$ Perimeter of a rectangle $= 2$ [Length + Width] [$\because$ width = breadth]
According to the question,

$2(x + 2x) = 180$

$\Rightarrow 2(3x) = 180$

$\Rightarrow 6x = 180$

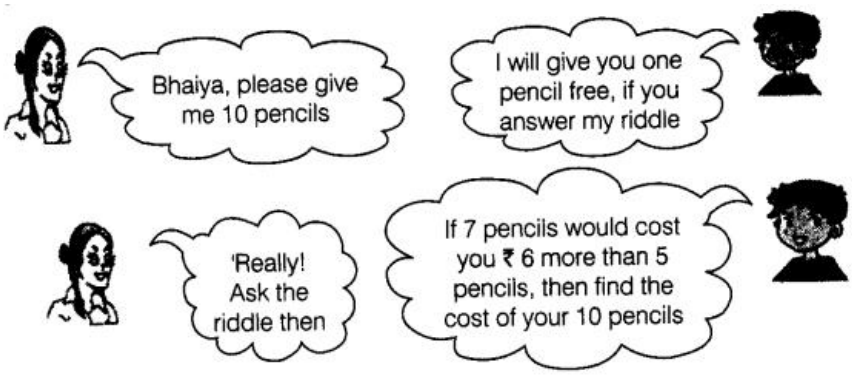
$x = \frac{180}{6} = 30$ cm

Hence, width of the rectangle is 30 cm and length of the rectangle is 2×30, i.e. 60 cm.

Question 100:

Look at this riddle?

If she answers the riddle correctly how ever will she pay for the pencils ?



Solution:

Let, the cost of one pencil be ₹ x.

Now, cost of such 7 pencils will be ₹ $7x$ and of 5 pencils will be ₹ $5x$.

It is given that cost of 7 pencils is ₹ 6 more than cost of 5 pencils. Therefore, we get the following equation

$$7x - 5x = 6$$

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

$$\Rightarrow \quad \frac{2x}{2} = \frac{6}{2} \qquad \text{[dividing both sides by 2]}$$

$$\Rightarrow \quad x = 3$$

Since, cost of one pencil is ₹ 3.

So, the cost of 10 pencils = $3 \times 10 =$ ₹ 30

Thus, she have to pay ₹ 30 for 10 pencils.

Question 101:

In a certain examination, a total of 3768 students secured first division in the years 2006 and 2007. The number of first division in 2007 exceeded those in 2006 by 34. How many students got first division in 2006?

Solution:

Let the number of students who got first division in year 2006 be x. Since, the number of first division in year 2007 exceeded those in year 2006 by 34, therefore the number of students who got first division in year 2007 will be (x + 34).

It is given that total number of students who got first division in years 2006 and 2007 is 3768.

According to the question, $x + (x + 34) = 3768$

$$\Rightarrow \quad 2x + 34 = 3768$$

$$\Rightarrow \quad 2x = 3768 - 34 \qquad \text{[transposing 34 to RHS]}$$

$$\Rightarrow \quad 2x = 3734$$

$$\Rightarrow \quad \frac{2x}{x} = \frac{3734}{2} \qquad \text{[dividing both sides by 2]}$$

$$\Rightarrow \quad x = 1867$$

Hence, 1867 students got first division in year 2006.

Question 102:

Radha got Rs. 17480 as her monthly salary and overtime. Her salary exceeds the overtime by Rs. 10000. What is her monthly salary?

Solution:

Radha's monthly salary and over-time = ₹ 17480 [given]

Let ₹ x be the her monthly salary.

Then, overtime = ₹ $(x - 10000)$

$\therefore \quad 17480 - x = x - 10000$

$\Rightarrow \quad 2x = 27480$

$\Rightarrow \quad x = 13740$

Hence, her monthly salary is ₹ 13740.

Question 103:

If one side of a square is represented by 18x – 20 and the adjacent side is represented by 42 – 13x, find the length of the side of the square.

Solution:

Given, one side of a square is $18x - 20$ and adjacent side is $42 - 13x$.

We know that, all the sides of a square are always equal.

$\therefore \quad 18x - 20 = 42 - 13x$

$\Rightarrow \quad 18x + 13x = 42 + 20$

$\Rightarrow \quad 31x = 62 \Rightarrow x = \frac{62}{31} = 2$ units

Hence, side of the square is $(18 \times 2) - 20 = 36 - 20 = 16$ units.

Question 104:

Follow the directions and correct the given incorrect equation, written in Roman numerals:

(a) Remove two of these matchsticks to make a valid equation :

$$IX - VI = V$$

(b) Move one matchstick to make the equation valid. Find two different solutions.

$$VI + IV = XI$$

Solution:

(a) Given, $IX - VI = V$

According to the question, we have to remove two matchsticks to make a valid equation.

Hence, $X - V = V$ [in numerical system]

$\Rightarrow \quad 10 - 5 = 5$

(b) Given $VI + IV = XI$

According to the question, we have to move one mathchstick to make a valid equation.

(i) $VI + IV = X$

$\Rightarrow \quad 6 + 4 = 10$ [in numerical system]

(ii) $VI - V = XI$

$\Rightarrow \quad 6 + 5 = 11$ [in numerical system]

Question 105:

What does a duck do when it flies upside down? The answer to this riddle is hidden in the equation given below :

If $i + 69 = 70$, then i = ? If $8u = 6u + 8$, then u = ?

If $4a = -5a + 45$, then a = ? If $4q + 5 = 17$, then q = ?

If $-5t - 60 = -70$, then t = ? If $\frac{1}{4}s + 98 = 100$, then s = ?

If $\frac{5}{3}p + 9 = 24$, then p = ?

If $3c = c + 12$, then c = ?

If $3(k + 1) = 24$, then k = ?

For riddle answer : substitute the number for the letter it equals

—	—	/	—	—	—	—	—	—	/	—	—
1	2	/	3	4	5	6	7	8	/	4	9

Solution:

We have, $i + 69 = 70$

$\Rightarrow$ $i = 70 - 69$ [transposing 69 to RHS]

$\Rightarrow$ $i = 1$

and $8u = 6u + 8$

$\Rightarrow$ $8u - 6u = 8$ [transposing $6u$ to LHS]

$\Rightarrow$ $2u = 8$

$\Rightarrow$ $\frac{2u}{2} = \frac{8}{2}$ [dividing both sides by 2]

$\Rightarrow$ $u = 4$

We have, $4a = -5a + 45$

$\Rightarrow$ $4a + 5a = 45$ [transposing $(-5a)$ to LHS]

$\Rightarrow$ $9a = 45$

$\Rightarrow$ $\frac{9a}{9} = \frac{45}{9}$ [dividing both sides by 9]

$\Rightarrow$ $a = 5$

and $4q + 5 = 17$

$\Rightarrow$ $4q = 17 - 5$ [transposing 5 to RHS]

$\Rightarrow$ $4q = 12$

$\Rightarrow$ $\frac{4q}{4} = \frac{12}{4}$ [dividing both sides by 4]

$\Rightarrow$ $q = 3$

We have, $-5t - 60 = -70$

$\Rightarrow$ $-5t = -70 + 60$ [transposing (-60) to RHS]

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

$\Rightarrow$ $\frac{-5t}{-5} = \frac{-10}{-5}$ [dividing both sides by (-5)]

$\Rightarrow$ $t = 2$

and $\frac{1}{4}s + 98 = 100$

$\Rightarrow$ $\frac{1}{4}s = 100 - 98$ [transposing 98 to RHS]

$\Rightarrow$ $\frac{1}{4}s = 2$

$\Rightarrow$ $\frac{4}{4}s = 4 \times 2$ [multiplying both sides by 4]

$\Rightarrow$ $s = 8$

We have, $\frac{5}{3}p + 9 = 24$

$\Rightarrow$ $\frac{5}{3}p = 24 - 9$ [transposing 9 to RHS]

$\Rightarrow$ $\frac{5}{3}p = 15$

$\Rightarrow$ $\frac{3}{5} \times \frac{5}{3}p = \frac{3}{5} \times 15$ [multiplying both sides by $\frac{3}{5}$]

$\Rightarrow$ $p = 9$

We have, $3c = c + 12$

$\Rightarrow$ $3c - c = 12$ [transposing c to LHS]

$\Rightarrow$ $2c = 12$

$\Rightarrow$ $\frac{2c}{2} = \frac{12}{2}$ [dividing both sides by 2]

$\Rightarrow$ $c = 6$

We have, $3(k+1)=24$

$\Rightarrow \quad \frac{3(k+1)}{3}=\frac{24}{3}$ [dividing both sides by 3]

$\Rightarrow \quad k+1=8$

$\Rightarrow \quad k=8-1$ [transposing 1 to RHS]

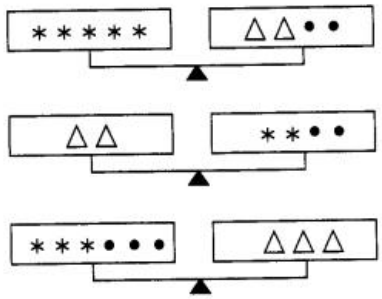
$\Rightarrow \quad k=7$

By substituting the number for the letter it equals, we get

$\frac{i}{1}\frac{t}{2}/\frac{q}{3}\frac{u}{4}\frac{a}{5}\frac{c}{6}\frac{k}{7}\frac{s}{8}/\frac{u}{4}\frac{p}{9}$

Question 106:

The three scales below are perfectly balanced, if • = 3. What are the values of Δ and *?



Solution:

Let the value of Δ and * be x and y, respectively and it is given that • = 3.

From (a), $y+y+y+y+y=x+x+3+3$

$\Rightarrow \quad 5y=2x+6$

$\Rightarrow \quad 5y-2x=6$

$\Rightarrow \quad 2x-5y=-6$ ...(i)

From (b), $x+x=y+y+3+3$

$\Rightarrow \quad 2x=2y+6$

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

$\Rightarrow \quad x-y=3$ [dividing both sides by 2]...(ii)

From (c), $y+y+y+3+3+3=x+x+x$

$\Rightarrow \quad 3y+9=3x$

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

$\Rightarrow \quad x-y=3$ [dividing both sides by 3]...(iii)

From Eq. (iii), $x-y=3 \Rightarrow x=y+3$

On putting $x=y+3$ in Eq. (i), we get

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

$\Rightarrow \quad 2y+6-5y=-6$

$-3y+6=-6$

$\Rightarrow \quad -3y=-6-6=-12$

$y=\frac{12}{3}=4$

On putting $y=4$ in Eq. (ii), we get $x-y=3$

$\Rightarrow \quad x-4=3$

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

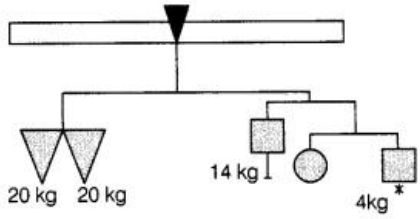
$\Rightarrow \quad x=7$

$\therefore$ Value of Δ = x = 7 and value of * = y = 4.

Question 107:

The given figure represents a weighing balance. The weights of some objects in the balance are given. Find the weight of each square and the circle.

Solution:


20 kg
20 kg
14 kg
4kg