

Unit 7 (Algebra)

Multiple Choice Questions (MGQs)

Question 1:

If each matchbox contains 50 matchsticks, then the number of matchsticks required to fill n such boxes is

- (a) $50 + n$ (b) $50n$ (c) $50 + n$ (d) $50 - n$

Solution:

(b) Given, each matchbox contains 50 matchsticks.

Then, total number of matchsticks in n boxes = Matchsticks in one box \times Total boxes
 $= 50 \times n = 50n$

Hence, (b) is correct option.

Question 2:

Amulya is x years of age now. 5 years ago, her age was

- (a) $(5 - x)$ years (b) $(5 + x)$ years (c) $(x - 5)$ years (d) $(5 + x)$ year

Solution:

(c) Given, Amulya's present age = x

5 years ago, Amulya's age = $(x - 5)$ years Hence, (c) is correct option.

Question 3:

Which of the following represent $6 \times b$?

- (a) $6b$ (b) $6/b$ (c) $6 + b$ (d) $6 - b$

Solution:

(a) Given that, $6 \times b = 6b$

Hence, (a) is correct option.

Note: In algebra multiplication, sign does not show in the product (result).

Question 4:

Which of the following is an equation?

- (a) $x + 1$ (b) $x - 1$ (c) $x - 1 = 0$ (d) $x + 1 > 0$

Solution:

(c) We know that, an expression with a variable, constants and the sign of equality ($=$) is called an equation.

So, $x - 1 = 0$ is an equation.

Hence, (c) is correct option.

Question 5:

If x takes the value 2, then the value of $x + 10$ is

- (a) 20 (b) 12 (c) 5 (d) 8

Solution:

(b) Given, expression = $x + 10$ On substituting $x = 2$, we get $x + 10 = 2 + 10 = 12$ Hence, (b) is correct option.

Question 6:

If the perimeter of a regular hexagon is x metres, then the length of each of its sides is

- (a) $(x + 6)$ metres (b) $(x - 6)$ metres
(c) $(x - 6)$ metres (d) $(6 + x)$ metres

Solution:

(b) Given, perimeter of regular hexagon is x metres, Number of sides in regular hexagon = 6
Length of each sides

$$\begin{aligned} &= \frac{\text{Perimeter of regular hexagon}}{\text{Number of sides in hexagon}} \\ &= \frac{x}{6} \text{ metres} \end{aligned}$$

Hence, (b) is correct option.

Question 7:

Which of the following equations has $x = 2$ as a solution?

- (a) $x + 2 = 5$ (b) $x - 2 = 0$
(c) $2x + 1 = 0$ (d) $x + 3 = 6$

Solution:

(b) To get solution as $x = 2$, solve each equation. .

For option (a),

$$\begin{aligned} &x + 2 = 5 \\ \Rightarrow &x = 5 - 2 && [\text{transposing } +2 \text{ to RHS}] \\ \Rightarrow &x = 3 \end{aligned}$$

For option (b),

$$\begin{aligned} &x - 2 = 0 \\ \Rightarrow &x = 2 && [\text{transposing } -2 \text{ to RHS}] \end{aligned}$$

For option (c),

$$\begin{aligned} &2x + 1 = 0 \\ \Rightarrow &2x = -1 && [\text{transposing } +1 \text{ to RHS}] \\ \Rightarrow &\frac{2x}{2} = \frac{-1}{2} && [\text{dividing both sides by 2}] \\ \Rightarrow &x = \frac{-1}{2} \end{aligned}$$

For option (d),

$$\begin{aligned} &x + 3 = 6 \\ \Rightarrow &x = 6 - 3 && [\text{transposing } +3 \text{ to RHS}] \\ \Rightarrow &x = 3 \end{aligned}$$

Therefore, we get $x = 2$ as a solution in option (b) only.

Hence, (b) is correct option.

Question 8:

For any two integers x and y , which of the following suggests that operation of addition is commutative?

- (a) $x + y = y + x$ (b) $x + y > x$
(c) $x - y = y - x$ (d) $x y = y x$

Solution:

(a) Let a and b be two integers, then in commutative property

$$a + b = b + a$$

Here, x and y are integers.

Then, $x + y = y + x$

Hence, (a) is correct option.

Question 9:

Which of the following equations does not have a solution in integers?

(a) $x + 1 = 1$ (b) $x - 1 = 3$

(c) $2x + 1 = 6$ (d) $1 - x = 5$

Solution:

(c) We know that, integers are

$-4, -3, -2, -1, 0, 1, 2, 3, 4$

Now, we check the equations.

For option (a),

$$x + 1 = 1$$

\Rightarrow

$$x = 1 - 1$$

[transposing + 1 to RHS]

\Rightarrow

$$x = 0, \text{ which is an integer.}$$

For option (b),

$$x - 1 = 3$$

\Rightarrow

$$x = 3 + 1$$

[transposing - 1 to RHS]

\Rightarrow

$$x = 4, \text{ which is an integer.}$$

For option (c),

$$2x + 1 = 6$$

\Rightarrow

$$2x = 6 - 1$$

[transposing + 1 to RHS]

\Rightarrow

$$2x = 5$$

\Rightarrow

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

[dividing both sides by 2]

\Rightarrow

$$x = \frac{5}{2}, \text{ which is not an integer.}$$

For option (d),

$$1 - x = 5$$

\Rightarrow

$$-x = 5 - 1$$

[transposing + 1 to RHS]

\Rightarrow

$$-x = 4$$

\Rightarrow

$$x = -4, \text{ which is an integer.} \quad [\text{dividing both sides by } -1]$$

Hence, (c) is correct option.

Question 10:

In algebra $a \times b$ means ab but in arithmetic 3×5 is

(a) 35 (b) 53 (c) 15 (d) 8

Solution:

(c) Given, in algebra, $a \times b = ab$, which means a is multiplied by b .

Also, in arithmetic, 3×5 means 3 is multiplied by 5.

$$3 \times 5 = 15$$

Hence, (c) is correct option.

Question 11:

In algebra, letters may stand for

(a) known quantities (b) unknown quantities

(c) fixed numbers (d) None of these

Solution:

(b) In algebra, letters may stand for unknown quantities.

Hence, (b) is correct option.

Question 12:

'Variable' means that it

(a) can take different values (b) has a fixed value

(c) can take only 2 values (d) can take only three values

Solution:

(a) Since, the value of a variable is not fixed.

So, variable means that it can take different values.

Hence, (a) is correct option.

Question 13:

$10 - x$ means

(a) 10 is subtracted x times (b) x is subtracted 10 times

(c) x is subtracted from 10 (d) 10 is subtracted from x

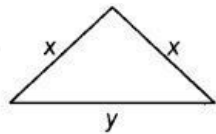
Solution:

(c) $10 - x$ means x is subtracted from 10.

Hence, (c) is correct option.

Question 14:

Savitri has a sum of Rs. x . She spent 11000 on grocery, Rs. 500 on clothes and Rs. 400 on education and received Rs. 200 as a gift. How much money (in Rs.) is left with her?



(a) $x - 1700$ (b) $x - 1900$

(c) $x + 200$ (d) $x - 2100$

Solution:

(a) Given,

Savitri has total money = Rs. x Spent on grocery = Rs. 1000 Spent on clothes = Rs. 500

Spent on education = Rs. 400 Received as a gift = Rs. 200

Then, money left with her = Rs. $\{x - [1000 + 500 + 400 - 200]\}$

= Rs. $\{x - [1900 - 200]\}$

= Rs. $\{x - 1700\}$

Hence, (a) is correct option.

Question 15:

The perimeter of the triangle as shown in the figure is

(a) $2x + y$ (b) $x + 2y$ (c) $x + y$ (d) $2x - y$

Solution:

(a) We know that, perimeter of the triangle = Sum of all sides of triangle

Here, sides are x , x and y .

Perimeter of the triangle = $x + x + y = 2x + y$

Hence, (a) is correct option.

Question 16:

The area of a square having each side x is

(a) $x \times x$ (b) $4x$ (c) $x + x$ (d) $4 + x$

Solution:

(a) Here, side = x

We know that, area of square = Side \times Side

Area of square = $x \times x$

Hence, (a) correct option.

Question 17:

The expression obtained when x is multiplied by 2 and then subtracted from 3 is

(a) $2x - 3$ (b) $2x + 3$ (c) $3 - 2x$ (d) $3x - 2$

Solution:

(c) First x is multiplied by 2.

$$2x \times -2x$$

Now, $2x$ is subtracted from 3 = $3 - 2x$

Hence, (c) is correct option.

Question 18:

$q/2 = 3$ has a solution

(a) 6 (b) 8 (c) 3 (d) 2

Solution:

(a) Given equation is

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

\Rightarrow

$$\frac{q}{2} \times 2 = 3 \times 2$$

[multiplying both sides by 2]

\Rightarrow

$$q = 6$$

Hence, (a) is correct option.

Question 19:

$x - 4 = -2$ has a solution

(a) 6 (b) 2 (c) -6 (d) -2

Solution:

(b) Given equation is

$$x - 4 = -2$$

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

$$\Rightarrow x = 2$$

Hence, (b) is correct option.

Question 20:

$4/2 = 2$ denotes a

(a) numerical equation (b) algebraic expression

(c) equation with a variable (d) false statement

Solution:

(a) We know that, an equation which contains only numbers is called a numerical equation.

Since, equation $4/2 = 2$ contains only numbers, so it is a numerical equation.

Hence, (a) is correct option.

Question 21:

Kanta has p pencils in her box. She puts q more pencils in the box. The total number of pencils with her are

(a) $p + q$ (b) pq (c) $p - q$ (d) p/q

Solution:

(a) Given, pencils in Kanta's box = p

When q more pencils are put in the box, then total number of pencils = $p + q$ Hence, (a) is correct option.

Question 22:

The equation $4x = 16$ is satisfied by the following value of x

(a) 4 (b) 2 (c) 12 (d) -12

Solution:

(a) Given equations $4x = 16$... (i)

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

$$\Rightarrow x = 4$$

Verification
 Put $x = 4$ in Eq. (i), then we get $4 \times 4 = 16 \Rightarrow 16 = 16$
 Therefore, value of x is 4.
 Hence, (a) is correct option.

Question 23:

I think of a number and on adding 13 to it, I get 27. Equation for this is

(a) $x - 27 = 13$ (b) $x - 13 = 27$ (c) $x + 27 = 13$ (d) $x + 13 = 27$

Solution:

(d) Let the number be x .

According to the question, $x + 13 = 27$ Hence, (d) is correct option.

Fill in the Blanks

In questions 24 to 40, fill in the blanks to make the statements true.

Question 24:

The distance (in km) traveled in h hours at a constant speed of 40 km per hours is

Solution:

40 h km

We know that, $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$$\therefore \text{Distance} = \text{Speed} \times \text{Time}$$

Here, $\text{Speed} = 40 \text{ km/h}$
 $\text{Time} = h \text{ h}$

$$\therefore \text{Distance} = 40 \times h = 40h \text{ km}$$

Question 25:

p kg of potatoes are bought for Rs. 70. Cost of 1 kg of potatoes (in Rs.) is

Solution:

Rs: 70/ p

Cost of p kg potatoes = Rs. 70

Cost of 1 kg potatoes = Rs. 70/ p

Question 26:

An autorickshaw charges Rs. 10 for the first kilometer, then Rs. 8 for each such subsequent kilometre.

The total charge (in Rs.) for d kilometres is

Solution:

$(8d + 2)$

Given, autorickshaw charges for first km = Rs. 10

After that, each such subsequent km charge = Rs. 8 Total distance = d km

\therefore Total charge = $10 + (d - 1) 8$

= $10 + 8d - 8$ = Rs. $8d + 2$

Question 27:

If $7x + 4 = 25$, then the value of x is

Solution:

$x = 3$

Given, $7x + 4 = 25$

$\Rightarrow 7x = 25 - 4$

[transposing + 4 to RHS]

$\Rightarrow 7x = 21$

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

[dividing both sides by 7]

$\Rightarrow x = 3$

Hence, the value of x is 3.

Question 28:

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

Solution:

-9

Given, $3x + 7 = -20$

$\Rightarrow 3x = -20 - 7$

[transposing +7 to RHS]

$\Rightarrow 3x = -27$

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

[dividing both sides by 3]

$\Rightarrow x = -9$

Hence, the solution of equation $3x + 7 = -20$ is -9.

Question 29:

'x exceeds y by T can be expressed as

Solution:

'x exceeds y by 7' can be expressed as $x = y + 7$.

Question 30:

8 more than three times the number 'x' can be written as

Solution:

Given, number = x

Now, three times of $x = 3x$

Then, according to the question $= 3x + 8$

Question 31:

Number of pencils for Rs. x at the rate of ₹ 2 per pencil is

Solution:

Given, total cost of pencils = ₹ x

Cost per pencil = ₹ 2

$$\text{Number of pencils} = \frac{\text{Total cost of pencils}}{\text{Cost per pencil}} = \frac{₹ x}{₹ 2}$$

Question 32:

The number of days in W weeks is

Solution:

We know that, number of days in 1 week = 7 So, number of days in W weeks = $7 \times W = 7W$

Question 33:

Annual salary at ₹ r rupees per month along with a festival bonus of Rs. 2000 is

Solution:

Given, bonus = Rs. 2000

Total months in one year = 12 Per months salary = Rs. r

\therefore Annual salary = Rs. $(12r + 2000)$

Question 34:

The two digit number whose ten's digit is t and unit digit is u is

Solution:

The number is $10t + u$.

Here, ten's digit = t , unit digit = u

\therefore Required number = $10 \times \text{Ten's digit} + 1 \times \text{Unit digit}$

$$= 10 \times t + u = 10t + u$$

Question 35:

The variable used in the equation $2p + 8 = 18$ is

Solution:

Given equation is $2p + 8 = 18$.

Here, variable p is used in the equation $2p + 8 = 18$ Note Value of p is not fixed.

Question 36:

p metres = centimetres

Solution:

$100p$. We know that, $1 \text{ metre} = 100 \text{ cm}$

$$\text{So, } p \text{ metres} = 100 \times p = 100p \text{ cm}$$

Question 37:

p litres = millilitres

Solution:

$$1000p$$

We know that, $1 \text{ litre} = 1000 \text{ millilitres}$

$$\text{So, } p \text{ litres} = 1000 \times p \text{ millilitres} = 1000p \text{ millilitres}$$

Question 38:

rupees = paise

Solution:

$$100r$$

We know that, $1 \text{ rupee} = 100 \text{ paise}$

$$\text{So, } r \text{ rupees} = 100 \times r \text{ paise} = 100r \text{ paise}$$

Question 39:

If the present age of Ramandeep is n years, then her age after 7 years will be

Solution:

$$(n + 7) \text{ years}$$

Given, present age of Ramandeep = n years Age after 7 yr = (Present age + 7) years = $(n + 7)$ years

Question 40:

If I spend f rupees from 100 rupees, money left with me is rupees.

Solution:

$$\text{Rs. } (100 - f)$$

Given, total money = Rs. 100

Spend money = Rs. f

$$\text{Left money with me} = \text{Total money} - \text{Money spent} = \text{Rs. } (100 - f)$$

True/False

In questions 41 to 55, state whether the given statements are True or False.

Question 41:

0 is a solution of the equation $x + 1 = 0$.

Solution:

False

Given, equation $x + 1 = 0$

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

So, -1 is the solution of the given equation.

Hence, the given statement is false.

Question 42:

The equations $x + 1 = 0$ and $2x + 2 = 0$ have the same solution.

Solution:

True

Given equations,

$$\Rightarrow x + 1 = 0 \quad \dots (i)$$

$$\Rightarrow 2x + 2 = 0 \quad \dots (ii)$$

$$\text{From Eq. (i), } x + 1 = 0$$

$$\Rightarrow x = -1 \quad [\text{transposing +1 to RHS}]$$

$$\text{From Eq. (ii), } 2x + 2 = 0$$

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

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

$$\Rightarrow x = -1$$

Clearly, the solution of both the equations are same.

So, the statement is true.

Question 43:

If m is a whole number, then $2m$ denotes a multiple of 2.

Solution:

True

Given, m is a whole number.

Put $m=0, 1, 2, 3, \dots$

$$2m = 2 \times 0 = 0,$$

$$2m = 2 \times 1 = 2$$

$$2m = 2 \times 2 = 4,$$

$$2m = 2 \times 3 = 6$$

Clearly, $2m$ is the multiple of 2.

So, multiples of 2 are 2, 4, 6, ...

Hence, the statement is true.

Question 44:

The additive inverse of an integer x is $2x$.

Solution:

False

Given, integer = x Additive inverse of $x = -x$

Then, the sum of integer and its additive inverse = $x + (-x)$

$$= x - x = 0$$

But according to question, additive inverse is $2x$. So, the statement is false.

Question 45:

If x is a negative integer, $-x$ is a positive integer.

Solution:

True

If x is a negative integer, then positive integer = $-(x)$

$$= -x$$

So, the statement is true.

Question 46:

$2x - 5 > 11$ is an equation.

Solution:

False

$2x - 5 > 11$ is not an equation because it has no equality (=) sign.

So, the statement is false.

Question 47:

In an equation, the LHS is equal to the RHS.

Solution:

True

In an equation, the LHS is equal to the RHS.

So, the statement is true.

Question 48:

In the equation $7k - 7 = 7$, the variable is 7.

Solution:

False

Equation is $7k - 7 = 7$ Here, variable is k.

So, the statement is false.

Question 49:

$a = 3$ is a solution of the equation $2a - 1 = 5$.

Solution:

True

Given equation is $2a - 1 = 5$

$$\Rightarrow 2a = 5 + 1$$

[transposing - 1 to RHS]

$$\Rightarrow 2a = 6$$

$$\Rightarrow \frac{2a}{2} = \frac{6}{2}$$

[dividing both sides by 2]

$$a = 3$$

Clearly, $a = 3$ is the solution of the given equation.

So, the statement is true.

Question 50:

The distance between New Delhi and Bhopal is not a variable.

Solution:

True

Distance between New Delhi and Bhopal is fixed.

Clearly, it is not a variable, so the statement is true.

Question 51:

1 minutes are equal to 60 seconds.

Solution:

True

We know that, 1 minute = 60 seconds [transposing +2 to RHS]

minutes = 60 x f seconds = 60 seconds So, the statement is true.

Question 52:

$x = 5$ is the solution of the equation $3x + 2 = 20$.

Solution:

False

Given equation is

$$\begin{aligned} &3x + 2 = 20 \\ \Rightarrow &3x = 20 - 2 && \text{[transposing +2 to RHS]} \\ \Rightarrow &3x = 18 \Rightarrow \frac{3x}{3} = \frac{18}{3} && \text{[dividing both sides by 3]} \\ \Rightarrow &x = 6 \end{aligned}$$

So, the solution of the given equation is $x = 6$.

But according to question, $x = 5$ is the solution of the given equation.

So, the statement is false.

Question 53:

'One-third of a number added to itself gives 8', can be expressed as

$$(x/3) + 8 = x.$$

Solution:

Let the number be x .

$$\therefore \text{One-third of the number} = \frac{1}{3} \times x = \frac{x}{3}$$

$$\text{Now, according to the given statement is } \frac{x}{3} + x = 8$$

$$\text{But given equation is } \frac{x}{3} + 8 = x$$

So, the statement is false.

Question 54:

The difference between the ages of two sisters Leela and Yamini is a variable.

Solution:

False

Difference between the ages of two sisters Leela and Yamini is not a variable because Leela's and Yamini's ages are fixed. But the value of a variable is not fixed.

So, the statement false.

Question 55:

The number of lines that can be drawn through a point is a variable.

Solution:

True

Because infinite number of lines can be drawn through a point.

In questions 56 to 74, choose a letter x , y , z , p etc.,

wherever necessary, for the unknown (variable) and write the corresponding expressions.

Question 56:

One more than twice the number.

Solution:

Let the number be x and twice the number $x = 2x$

Now, according to question,

$$\text{The expression} = 2x + 1$$

Hence, required expression is $2x + 1$.

Question 57:

20°C less than the present temperature.

Solution:

Let the present temperature be $f^\circ\text{C}$.

\therefore Required expression

$$= \text{Present temperature} - 20^\circ\text{C} = (f - 20)^\circ\text{C}$$

Question 58:

The successor of an integer.

Solution:

Let the integer be n .

Successor of $n = n + 1$

\therefore Required expression $= n + 1$

Note: If 1 is added to a number, we get its successor.

Question 59:

The perimeter of an equilateral triangle, if side of the triangle is m .

Solution:

Given, side of triangle is m .

In equilateral triangle, all sides are equal.

\therefore Perimeter of an equilateral triangle = Sum of all the sides

$= m + m + m = 3m$

Hence, the perimeter of an equilateral triangle is $3m$.

Question 60:

Area of the rectangle with length k units and breadth n units.

Solution:

Given, length of rectangle $= k$ units

Breadth of rectangle $= n$ units

Now, area of rectangle $= \text{Length} \times \text{Breadth} = k \times n = kn$ units

Hence, area of the rectangle is kn sq units.

Question 61:

Omar helps his mother 1 hour more than his sister does.

Solution:

Let sister's helping hours $= x$ years

Then, Omar's helping hour $= \text{Sister's helping hour} + 1 = (x + 1)$ years

\therefore Required expression $= (x + 1)$ years

Question 62:

Two consecutive odd integers.

Solution:

Any odd integer can be written as $2n + 1$, where n is an integer.

So, next odd integer will be $(2n + 1) + 2$, i.e. $2n + 3$.

Hence, two consecutive odd integers are $2n + 1$ and $2n + 3$.

Note: A sequence of consecutive even or odd integer is a list of two or more integers which increase by 2 from one integer to the next consecutive integer. They have a difference of 2 between every two integers.

Question 63:

Two consecutive even integers.

Solution:

Any even integer can be written as $2n$, where n is an integer. So, next even integer will be $2n + 2$.

Hence, two consecutive even integers are $2n$ and $2n + 2$.

Question 64:

Multiple of 5.

Solution:

The multiples of a whole number are found by taking the product of any counting number and that whole number.

Multiples of 5 are Multiply 5 by 1 $\rightarrow 5 \times 1 = 5$ Multiply 5 by 2 $\rightarrow 5 \times 2$ and so on.

Hence, multiple of 5 = $5n$, where n is any whole number.

Question 65:

The denominator of a fraction is 1 more than its numerator.

Solution:

Let the numerator be x .

Then, denominator = $x + 1$

Now, fraction = $\frac{\text{Numerator}}{\text{Denominator}} = \frac{x}{x+1}$

Hence, the required expression is $\frac{x}{x+1}$.

Question 66:

The height of Mount Everest is 20 times the height of Empire State building.

Solution:

Let height of Empire State be h metre.

Then, height of Mount Everest = $20 \times h = 20h$ metre Hence, the required expression is $20h$.

Question 67:

If a notebook costs t p and a pencil costs Rs. 3, then the total cost (in Rs.) of two notebooks and one pencil.

Solution:

Given,

Cost of one notebook = Rs. p Cost of 2 notebooks = $2 \times p = \text{Rs. } 2p$ Similarly, cost of one pencil

= Rs. 3 Now, total cost = Cost of 2 notebooks + Cost of one pencil = Rs. $(2p+3)$

Hence, the required expression is $2p + 3$.

Question 68:

z is multiplied by -3 and the result is subtracted from 13.

Solution:

According to the question,

z is multiplied by $-3 = (-3) \times z$

Now, result is subtracted from 13 = $13 - (-3)z = 13 + 3z$

Hence, the required expression is $13 + 3z$.

Question 69:

p is divided by 11 and the result is added to 10.

Solution:

According to the question, p is divided by 11 = $\frac{p}{11}$

Now, result is added to 10,

i.e. $10 + \frac{p}{11}$

Hence, the required expression is $10 + \frac{p}{11}$.

Question 70:

x times of 3 is added to the smallest natural number.

Solution:

According to the question, x times of 3 = $3x$ and smallest natural number = 1 Now, according to question,

Resulting expression = $3x + 1$ Hence, the required expression is $3x + 1$.

Question 71:

6 times q is subtracted from the smallest two digit number.

Solution:

6 times of $q = 6q$

and smallest two digit number = 10

Then, according to question, resulting expression = $10 - 6q$

Hence, the required expression = $10 - 6q$

Question 72:

Write two equations for which 2 is the solution.

Solution:

Let the two numbers be x and y , which has solution 2 in equation.

- (i) For getting first equation, the number x is multiplied by 2, then the number is $2x$. After that, 3 is subtracted from it which results into 1.

Hence, $2x - 3 = 1$

$$2x = 3 + 1$$

[transposing -3 to RHS]

$$\Rightarrow 2x = 4$$

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

[dividing both sides by 2]

- (ii) For getting second equation, the number y is multiplied by 3, then the number is $3y$. After that, it will be added to 4 which results into 10.

Hence, $3y + 4 = 10$

On solving, $3y = 10 - 4$

$$\Rightarrow 3y = 6$$

[transposing $+4$ to RHS]

$$\Rightarrow \frac{3y}{3} = \frac{6}{3}$$

[dividing both sides by 3]

$$\Rightarrow y = 2$$

Hence, two equations are

$$2x - 3 = 1 \text{ and } 3y + 4 = 10.$$

Question 73:

Write an equation for which 0 is a solution.

Solution:

Let the one number be x which have solution 0 in equation.

Now, for getting equation, the number x is multiplied by 2, then the number is $2x$.

After that, it will be added to 3 which results into 3.

Hence, $2x + 3 = 3$

On solving $2x = 3 - 3 = 0$

[transposing $+3$ to RHS]

$$\Rightarrow \frac{2x}{2} = \frac{0}{2}$$

[dividing both sides by 2]

$$\Rightarrow x = 0$$

Hence, required equation is $2x + 3 = 3$.

Question 74:

Write an equation whose solution is not a whole number.

Solution:

We know that, whole numbers are 0,1,2, 3,...

Now, let the one number be x whose solution is not a whole number.

For getting equation, the number x will be added to 1 which results into 0. Then,

$$x + 1 = 0 \text{ [transposing } +1 \text{ to RHS]}$$

On solving $x = -1$

which is not a whole number.

Hence, required equation is $x + 1 = 0$.

In questions 75 to 84, change the statements, converting expression into statements in ordinary language.

Question 75:

A pencil costs Rs. p and a pen costs $15p$.

Solution:

The cost of a pen is 5 times the cost of a pencil.

Question 76:

Leela contributed Rs. y towards the Prime Minister's Relief Fund. Leela is now left with Rs. $(y + 10000)$.

Solution:

Amount left with Leela is Rs. 10000 more than the amount she contributed towards Prime Minister's Relief Fund.

Question 77:

Kartik is n years old. His father is $7n$ years old.

Solution:

Age of Kartik's father is seven times the age of Kartik.

Question 78:

The maximum temperature on a day in Delhi was $p^{\circ}\text{C}$. The minimum temperature was $(p - 10)^{\circ}\text{C}$.

Solution:

The difference between maximum and minimum temperature on a day in Delhi was 10°C .

Question 79:

John planted t plants last year. His friend Jay planted $2t + 10$ plants that year.

Solution:

Last year, Jay planted 10 more plants than twice the number of plants planted by John.

Question 80:

Sharad used to take p cups of tea in a day. After having some health problem, he takes $p - 5$ cups of tea a day.

Solution:

Sharad reduced the consumption of tea per day by 5 cups after having some health problem.

Question 81:

The number of students dropping out of school last year was m . Number of students dropping out of school this year is $m - 30$.

Solution:

The number of students dropping out of school this year is 30 less than the number of students dropped last year,

Question 82:

Price of petrol was Rs. p per litre last month. Price of petrol now is Rs. $(p - 5)$ per litre.

Solution:

The price of petrol per litre is decreased this month by Rs. 5 than its price last month.

Question 83:

Khader's monthly salary was Rs. p in the year 2005. His salary in 2006 was Rs. $(p + 1000)$.

Solution:

Khader's monthly salary is increased by Rs. 1000 in the year 2006 than in 2005.

Question 84:

The number of girls enrolled in a school last year was g . The number of girls enrolled this year in the school is $3g - 10$.

Solution:

The number of girls enrolled this year was 10 less than 3 times the girls enrolled last year.

Question 85:

Translate each of the following statements into an equation, using x as the variable.

- (a) 13 subtracted from twice a number gives 3.
- (b) One-fifth of a number is 5 less than that number.
- (c) Two-third of a number is 12.
- (d) 9 added to twice a number gives 13.
- (e) 1 subtracted from one-third of a number gives 1.

Solution:

- (a) Let the number be x .

Twice the number $= 2x$

According to the question,

$$2x - 13 = 3$$

Hence, the required equation is $2x - 13 = 3$.

- (b) Let the number be x .

One-fifth of this number $= \frac{x}{5}$

According to the question, $\frac{x}{5} = x - 5$

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

- (c) Let the number be x .

Two-third of this number $= \frac{2}{3}x$

According to the question, $\frac{2x}{3} = 12$

Hence, the required equation is $\frac{2x}{3} = 12$.

- (d) Let the number be x .

Twice of this number $= 2x$

According to the question, $2x + 9 = 13$

Hence, the required equation is $2x + 9 = 13$.

- (e) Let the number be x .

One-third of this number $= \frac{x}{3}$

According to question, $\frac{x}{3} - 1 = 1$

Hence, the required equation is $\frac{x}{3} - 1 = 1$.

Question 86:

Translate each of the following statements into an equation.

- (a) The perimeter (p) of an equilateral triangle is three times of its side (a).
- (b) The diameter (d) of a circle is twice its radius (r).
- (c) The selling price (s) of an item is equal to the sum of the cost price (c) of an item and the profit (p) earned.

(d) Amount (a) is equal to the sum of principal (p) and interest (i).

Solution:

(a) Given,

Perimeter of an equilateral triangle = p

Side of an equilateral triangle = a Then, three times of side (a) = 3a Then, according to the question, $p = 3a$

(b) Given,

Diameter of a circle = d

Radius of a circle = r

Twice of radius, $d = 2r$

Then, according to the question, $d = 2r$

(c) Given, selling price of an item = Rs. s Cost price of an item = Rs. c

Profit = Rs. p

Then, according to question, $s = c + p$

(d) Given, amount = Rs. a Principal = Rs. p Interest = Rs.

Then, according to the question, $a = p + i$

Question 87:

Let Kanika's present age be x years. Complete the following table, showing ages of her relatives.

	Situation (described in ordinary language)	Expression
(i)	Her brother is 2 years younger.	_____
(ii)	Her father's age exceeds her age by 35 years.	_____
(iii)	Mother's age is 3 years less than that of her father.	_____
(iv)	Her grandfather's age is 8 times of her age.	_____

(i) Her brother is 2 years younger.

(ii) Her father's age exceeds her age by 35 years.

(iii) Mother's age is 3 years less than that of her father.

(iv) Her grandfather's age is 8 times of her age.

Solution:

Given, Kanika's present age = x yr

(i) Her brother's age = $x - 2$ yr [v her brother is 2 years younger]

(ii) Kanika's present age = x yr

Father's age = Kanika's present age + 35 = $x + 35$ yr

(iii) Kanika's present age = x yr

Father's age = $(x + 35)$ yr [from part (ii)]

and Mother's age = Father's age - 3 = $x + 35 - 3$

= $(x + 32)$ yr

(iv) Kanika's present age = x yr

Now, grandfather's age = 8 times of Kanika's age = $8 \times x = 8x$ yr

Question 88:

If m is a whole number less than 5, complete the table and by inspection of the table, find the solution of the equation $2m - 5 = -1$.

m					
$2m - 5$					

Solution:

Since, m is a whole number which is less than 5, then solution of the equation is given by putting the value of

$$m = 0, 1, 2, 3, 4, \dots$$

Now, put $m = 0$, then

$$\Rightarrow 2m - 5 = 2 \times 0 - 5 = -5$$

Put $m = 1$, then

$$2m - 5 = 2 \times 1 - 5 = -3$$

Put $m = 2$, then

$$2m - 5 = 2 \times 2 - 5 = 4 - 5 = -1$$

Put $m = 3$, then

$$2m - 5 = 2 \times 3 - 5 = 6 - 5 = 1$$

Put $m = 4$, then

$$2m - 5 = 2 \times 4 - 5 = 3$$

Hence, table is

m	0	1	2	3	4
$2m - 5$	-5	-3	-1	1	3

and given equation is $2m - 5 = -1$

$$\Rightarrow 2m = -1 + 5 \quad [\text{transposing } -5 \text{ to RHS}]$$

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

$$\Rightarrow m = 2$$

Question 89:

A class with p students has planned a picnic. x 50 per student is collected, out of which x 1800 is paid in advance for transport. How much money is left with them to spend on other items?

Solution:

Total number of students = p

Money collect from per student = x 50 Total money collected = x 50 p Advance money paid

for transport = x 1800 Money left with them = x (50 p -1800)

Question 90:

In a village, there are 8 water tanks to collect rain water. On a particular day, x litres of rain water is collected per tank. If 100 litres of water was already there in one of the tanks, then what is the total amount of water in the tanks on that day?

Solution:

According to the question,

Number of tanks to collect rain water = 8 Rain water collected in per tank (in L)= x Then,

total rain water in tanks (in L)

= Number of tanks \times Rain water collected per tank = $8 \times x = 8x$

But in the one tank, already 100 L of water exist,.

Then, total amount of water in the tank

= $100 + [\text{Total rain water in L}]$

= $(100 + 8x)$

Question 91:

What is the area of a square whose side is m cm?

Solution:

Given,

Side of a square = m cm

\therefore Area of a square = Side \times Side = $m \times m$ cm

Question 92:

Perimeter of a triangle is found by using the formula $p = a + b + c$, where a , b and c are the sides of the triangle. Write the rule that is expressed by this formula in words.

Solution:

In this question, given formula for getting perimeter of triangle is $p = a + b + c$.

Here, a , b and c are the length of sides of the triangle.

Hence, the perimeter of a triangle is equal to the sum of all sides of a triangle.

Question 93:

Perimeter of a rectangle is found by using the formula $p = 2(l + w)$, where l and w are respectively the length and breadth of the rectangle. Write the rule that is expressed by this formula in words.

Solution:

Perimeter of a rectangle = 2 (Length of the rectangle + Breadth of the rectangle)

i.e. The perimeter of a rectangle is twice the sum of its length and breadth.

Question 94:

On my last birthday, I weighed 40 kg. If I put on m kg of weight after a year, what is my present weight?

Solution:

Given, my weight on my last birthday = 40 kg

Weight increase after a year = m kg

Present weight = 40 kg + m kg = $(40 + m)$ kg

Question 95:

Length and breadth of a bulletin board are r cm and t cm, respectively.

(i) What will be the length (in cm) of the aluminium strip required to frame the board, if 10 cm extra strip is required to fix it properly.

(ii) If x nails are used to repair one board, then how many nails will be required to repair 15 such boards?

(iii) If 500 sq cm extra cloth per board is required to cover the edges, then what will be the total area of the cloth required to cover 8 such boards?

(iv) What will be the expenditure for making 23 boards, if the carpenter charges $\text{Rs. } x$ per board?

Solution:

Given, length of bulletin board = r cm and breadth of bulletin board = t cm Then, perimeter of bulletin board = $2(r + t)$ cm and area of bulletin board = rt cm

(i) Required length of aluminium strip = $[2(r + t) + 10]$ cm

(ii) To repair one board, number of nails required = x For 15 boards, number of nails required = $15x$

(iii) Area of one board = rt sq cm

Area of eight boards = 8 x Area of one board = $8rt$ sq cm

Extra cloth for one board = 500 sq cm [given]

Extra cloth for 8 boards = $500 \times 8 = 4000$ sq cm Required area of the cloth to cover 8 boards = $(8rt + 4000)$ sq cm

(iv) Charges for one board = Rs. x Charges of 23 boards = Rs. $23x$

Hence, expenditure for making 23 boards is $\text{Rs. } 23x$.

Question 96:

Sunita is half the age of her mother Geeta. Find their ages (i) after 4 years? (ii) before 3 years?

Solution:

Let the age of Sunita's mother = $2x$ yr

Then, according to the question,

$$\text{Sunita's age} = \left(\frac{1}{2}\right) \times \text{Age of Sunita's mother} = 2x/2$$

After 4 yr,

$$\text{Sunita's age} = (x + 4)\text{yr}$$

$$\therefore \text{Her mother's age} = (2x + 4)\text{yr}$$

Note After 4 years means, 4 years is added in present age.

(ii) Before 3 yr,

$$\text{Sunita's age} = (x - 3)\text{yr}$$

$$\text{and her mother's age} = (2x - 3)\text{yr}$$

Note: Before 3 years means, 3 years is subtracted from present age.

Question 97:

Match the items of Column I with that of Column II

Column I	Column II
(i) The number of corners of a quadrilateral	(a) =
(ii) The variable in the equation $2p + 3 = 5$	(b) constant
(iii) The solution of the equation $x + 2 = 3$	(c) + 1
(iv) Solution of the equation $2p + 3 = 5$	(d) - 1
(v) A sign used in an equation	(e) p
	(f) x

Solution:

(i) The number of corners of a quadrilateral are 4, which is a constant.

(ii) Given, equation is $2p + 3 = 5$

Here, variable = p

(iii) Given, equation is $x + 2 = 3$

$$\Rightarrow x = 3 - 2$$

[transposing +2 to RHS]

$$\Rightarrow x = 1$$

(iv) Given, equation is $2p + 3 = 5$

$$\Rightarrow 2p = 5 - 3$$

[transposing +3 to RHS]

$$\Rightarrow 2p = 2$$

$$\Rightarrow \frac{2p}{2} = \frac{2}{2}$$

[dividing both sides by 2]

$$\Rightarrow p = 1$$

(v) Equal (=) sign is used in an equation.

Hence, the correct matching is

$$(i) \rightarrow (b)$$

$$(ii) \rightarrow (e)$$

$$(iii) \rightarrow (c)$$

$$(iv) \rightarrow (d)$$

$$(v) \rightarrow (a)$$