CHAPTER 11

# Algebra

## Understanding the Lesson

- Algebra as a branch of Mathematics.
- Variables and constants.
- Matchstick Patterns.
- Use of fundamental operations like '+', '–', '×', and '÷' in algebra.
- Algebraic equations
- Solutions of an algebraic equations.
- Formation of an algebraic equations on the basis of given conditions.
- Use of variables in common rules.
- Use of algebraic symbols in geometrical shapes.
- Algebraic expression

## Conceptual Facts

- In algebra, we generally use the letters like '$a$', '$b$', '$c$', '$d$', '$x$', '$y$', '$z$' or any other symbol to represent an unspecified number.
- These letters are called 'literals' or 'variables'.
- Numbers such as 2, 5, 6, –7, 8 etc. are called 'constants'.
- The literal numbers obey the four fundamental operations i.e., '+', '–', '×', '÷'.
- We can establish some rules in making few geometrical shapes using matchsticks such as $2n$, $3n$ or $5n$ where $n$ is variable and 2, 3, 5..... are constants.
- Rules of Arithmetics can also be represented by algebraic symbols.
  - (*i*) Commutative law of addition: $a + b = b + a$
  - (*ii*) Commutative law of multiplication $a \times b = b \times a$
  - (*iii*) Distributive law over addition $a \times (b + c) = a \times b + a \times c$
  - (*iv*) Associative law of addition $(a + b) + c = a + (b + c)$
- Algebraic Expression: Expression like $4x + 5$, $y - 3$, $4z - 3$ are called as algebraic expression where $x$, $y$ and $z$ are variables.
- An algebraic equation has two sides, left hand side (LHS) and right hand side (RHS), with equal sign (=) between the two sides.
- The value of the variable in an algebraic equation which satisfies the equation is called a solution to the equation.

### EXERCISE 11.1

**Q1.** Find the rule which gives the number of matchsticks required to make the following matchsticks patterns. Use a variable to write the rule.

(*a*) A pattern of letter T as T

(*b*) A pattern of letter Z as Z

(*c*) A pattern of letter U as U

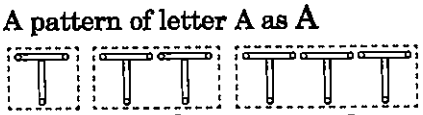
(*d*) A pattern of letter V as V

(*e*) A pattern of letter E as E

(*f*) A pattern of letter S as S

(*g*) A pattern of letter A as A

**Sol.** (*a*)



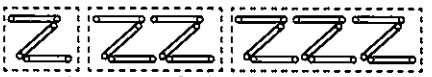
Number of matchsticks required to make the pattern of T

For $n = 1$ is $2 \times n$

For $n = 2$ is $2 \times n$

For $n = 3$ is $2 \times n$

$\therefore$ Rule is $2n$ where $n$ is number of Ts.

(b) 

$n = 1$ $n = 2$ $n = 3$

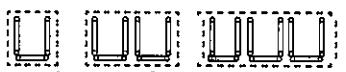
Number of matchsticks required to make the pattern of Z.

For $n = 1$ is $3 \times n$

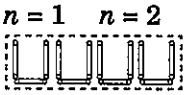
For $n = 2$ is $3 \times n$

For $n = 3$ is $3 \times n$

$\therefore$ Rule is $3n$ where $n$ is number of Zs.

(c) 

$n = 1$ $n = 2$ $n = 3$



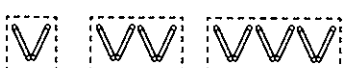
$n = 4$

Number of matchsticks required to make the pattern U.

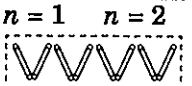
For $n = 1$ is $3 \times n$ | For $n = 3$ is $3 \times n$

For $n = 2$ is $3 \times n$ | For $n = 4$ is $3 \times n$

$\therefore$ Rule is $3n$ where $n$ is number of Us.

(d) 

$n = 1$ $n = 2$ $n = 3$



$n = 4$

Number of matchsticks required

For $n = 1$ is $2 \times n$ | For $n = 3$ is $2 \times n$

For $n = 2$ is $2 \times n$ | For $n = 4$ is $2 \times n$

$\therefore$ Rule is $2n$ where $n$ is the number of Vs.

(e) 

$n = 1$ $n = 2$ $n = 3$

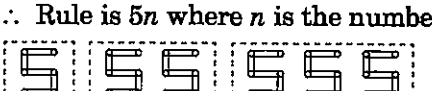
Number of matchsticks required

For $n = 1$ is $5 \times n$

For $n = 2$ is $5 \times n$

For $n = 3$ is $5 \times n$

$\therefore$ Rule is $5n$ where $n$ is the number of Es.

(f) 

$n = 1$ $n = 2$ $n = 3$

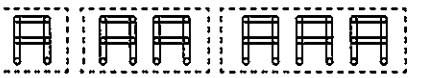
Number of matchsticks required

For $n = 1$ is $5 \times n$

For $n = 2$ is $5 \times n$

For $n = 3$ is $5 \times n$

$\therefore$ Rule is $5n$ where $n$ is number of Ss.

(g) 

$n = 1$ $n = 2$ $n = 3$

Number of matchsticks required

For $n = 1$ is $6 \times n$

For $n = 2$ is $6 \times n$

For $n = 3$ is $6 \times n$

$\therefore$ Rule is $6n$ where $n$ is number of As.

**Q2.** We already know the rule for the pattern of letters L, C and F. Some of the letters from Q1. (given above) give us the same rule as that given by L. Which are these? Why does this happen?

**Sol.** Rule for the following letters

| | |
|---|---|
| For L it is $2n$ | For C it is $3n$ |
| For V it is $2n$ | For F it is $3n$ |
| For T it is $2n$ | For U it is $3n$ |

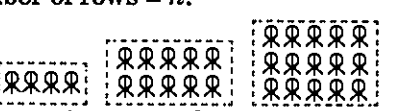
We observe that the rule is same of L, V and T as they required only 2 matchsticks.

Letters C, F and U have the same rule, i.e., $3n$ as they require only 3 sticks.

**Q3.** Cadets are marching in a parade. There are 5 cadets in a row. What is the rule which gives the number of cadets, given the number of rows? (use $n$ for the number of rows.)

**Sol.** Number of cadets in a row = 5

Number of rows = $n$.



$n = 1$ $n = 2$ $n = 3$

Number of cadets

For $n = 1$ is $5 \times n$

For $n = 2$ is $5 \times n$

For $n = 3$ is $5 \times n$

$\therefore$ Rule is $5n$ where $n$ represents the number of rows.

**Q4.** If there are 50 mangoes in a box, how will you write the total number of mangoes in terms of the number of boxes? (Use $b$ for the number of boxes.)

**Sol.** Number of boxes = $b$

Number of mangoes in a box = 50

Number of mangoes,

For $n = 1$ is $50 \times b$

For $n = 2$ is $50 \times b$

For $n = 3$ is $50 \times b$

$\therefore$ Rule is $50b$ where $b$ represents the number of boxes.

**Q5.** The teacher distributes 5 pencils per student. Can you tell how many pencils are needed, given the number of students? (Use $s$ for the number of students.)

**Sol.** Number of students = $s$

Number of pencils distributed per students = 5

Number of pencils required

For $n = 1$ is $5 \times s$ | For $n = 3$ is $5 \times s$

For $n = 2$ is $5 \times s$

$\therefore$ Rule is $5s$ where $s$ represents the number of students.

**Q6.** A bird flies 1 kilometre in one minute. Can you express the distance covered by the bird in terms of is flying time in minutes? (Use $t$ for flying time in minutes.)

**Sol.** Distance covered in 1 minute = 1 km.

The flying time = $t$

Distance covered

For $n = 1$ is $1 \times t$ km | For $n = 3$ is $1 \times t$ km

For $n = 2$ is $1 \times t$ km

$\therefore$ Rule is $1.t$ km where $t$ represents the flying time.

**Q7.** Radha is drawing a dot Rangoli (a beautiful pattern of lines joining dots with chalk powder. She has a dots in a row. How many dots will her rangoli have for $r$ rows? How many dots are there if there are 8 rows? If there are 10 rows?

**Sol.** Number of rows = $r$

Number of dots in a row drawn by Radha = 8

$\therefore$ The number of dots required

For $r = 1$ is $8 \times r$ | For $r = 3$ is $8 \times r$

For $r = 2$ is $8 \times r$

$\therefore$ Rule is $8r$ where $r$ represents the number of rows.

For $r = 8$, the number of dots = $8 \times 8 = 64$

For $r = 10$, the number of dots = $8 \times 10 = 80$

**Q8.** Leela is Radha's younger sister. Leela is 4 years younger than Radha. Can you write Leela's age in terms of Radha's age? Take Radha's age to be $x$ years.

**Sol.** Radha's age = $x$ yeas.

Given that Leela's age

= Radha's age $-$ 4 years

= $x$ years $-$ 4 years

= $(x - 4)$ years

**Q9.** Mother has made laddus. She gives some laddus to guests and family members, still 5 laddus remain. If the number of laddus mother gave away is $l$, how many laddus did she make?

**Sol.** Given that the number of laddus given away = $l$

Number of laddus left = 5

$\therefore$ Number of laddus made by mother = $l + 5$

**Q10.** Oranges are to be transferred from larger boxes into smaller boxes. When a large box is emptied, the oranges from it fill two smaller boxes and still 10 oranges remain outside. If the number of oranges in a small box are taken to be $x$, What is the number of oranges in the larger box?

**Sol.** Given that, the number of oranges in smaller box = $x$

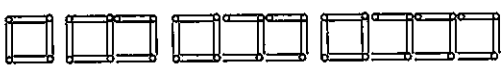
$\therefore$ Number of oranges in bigger box = 2(number of oranges in small box) + (Number of oranges remain outside)

So, the number of oranges in bigger box

$$= 2x + 10$$

**Q11.** ($a$) Look at the following matchstick pattern of square. The squares are not separate. Two neighbouring squares have a common matchstick. Observe the patterns and find the rule that gives the number of matchsticks in terms of the number of squares.

(**Hint:** If you remove the vertical stick at the end, you will get a pattern of Cs)



($a$) ($b$) ($c$) ($d$)

($b$) Following figure gives a matchstick pattern of triangles. As in Exercise 11($a$) above, find the general rule that gives the number of matchsticks in terms of the number of triangles.

($a$) ($b$) ($c$) ($d$)

**Sol.** ($a$) Let $n$ be the number of squares.

$\therefore$ Number of matchsticks required

For $n = 1$ is $3 \times n + 1 = 3n + 1 = 4$

For $n = 2$ is $3 \times n + 1 = 3n + 1 = 7$

For $n = 3$ is $3 \times n + 1 = 3n + 1 = 10$

For $n = 4$ is $3 \times n + 1 = 3n + 1 = 13$

$\therefore$ Rule is $3n + 1$ where $n$ represents the number of squares.

($b$) Let $n$ be the number of triangles.

$\therefore$ Number of matchsticks required

For $n = 1$ is $2n + 1 = 3$

For $n = 2$ is $2n + 1 = 5$

For $n = 3$ is $2n + 1 = 7$

For $n = 4$ is $2n + 1 = 9$

$\therefore$ Rule is $2n + 1$ where $n$ represents the number of matchsticks.

## EXERCISE 11.2

**Q1.** The side of an equilateral triangle is shown by $l$. Express the perimeter of the equilateral triangle using $l$.

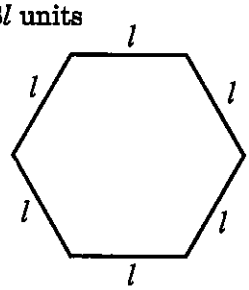
**Sol.** Given that the side of an equilateral triangle = $l$

$\therefore$ Perimeter of the equilateral triangle

$= 3 \times \text{side} = 3 \times l = 3l$ units

**Q2.** The side of a regular hexagon (See figure) is denoted by $l$. Express the perimeter of the hexagon using $l$.

(**Hint:** A regular hexagon has all its six sides equal in length)



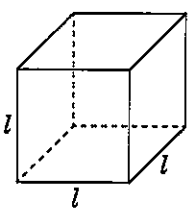

**Sol.** Given that each side of a hexagon = $l$

$\therefore$ Perimeter of the regular hexagon

$= l + l + l + l + l + l$

$= 6 \times l = 6l$ units

**Q3.** A cube is a three-dimensional figure as shown in (see figure). It has six faces and all of them are identical squares. The length of an edge of the cube is given by $l$. Find the formula for the total length of the edges of a cube.




**Sol.** We know that a cube has 12 edges and 6 identical faces.

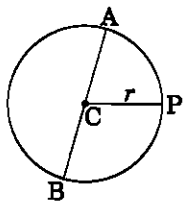
Since all edges are of equal length.

$\therefore$ Total length of the edges

$= 12 \times l = 12\ l$ units

$\therefore$ Required formula = $12\ l$ units

**Q4.** The diameter of a circle is a line which joins two points on the circle and also passes through the centre of the circle. (In the adjoining figure AB is a diameter of the circle; C is its centre). Express the diameter of the circle ($d$) in terms of its radius ($r$).




**Sol.** Given that radius = $r$

and diameter = $d$

$\therefore$ Diameter = $2 \times$ radius = $2 \times r = 2r$

So, diameter = $2r$.

**Q5.** To find sum of three numbers 14, 27 and 13, we can have two ways;

($a$) We may first add 14 and 27 to get 41 and then add 13 to it to get the total sum 54 or

($b$) We may add 27 and 13 to get 13 to get 40 and then add 14 to get the sum 54.

Thus, $(14 + 27) + 13 = 14 + (27 + 13)$

This can be done for any three numbers. This property is known as the associativity of addition of numbers. Express this property which we have already studied in the chapter on whole numbers, in a general way, by using $a$, $b$, and $c$.

**Sol.** Given three numbers are $a$, $b$ and $c$.

Associative property of addition of numbers

$= (a + b) + c = a + (b + c)$

## EXERCISE 11.3

**Q1.** Make up as many expressions with numbers (no variables) as you can from three numbers 5, 7 and 8. Every number should be used not more than once. Use only addition, subtractions and multiplication.

**Sol.** Given numbers are 5, 7 and 8.

Expressions are:

($i$) $8 + (5 + 7)$ ($ii$) $5 + (8 - 7)$

($iii$) $8 + (5 \times 7)$ ($iv$) $7 - (8 - 5)$

($v$) $7 \times (8 + 5)$ ($vi$) $5 \times (8 + 7)$

($vii$) $8 \times (5 + 7)$ ($viii$) $7 + (8 - 5)$

($ix$) $(5 \times 7) - 8$ ($x$) $7 + (8 \times 5)$

**Q2.** Which out of the following are expressions with numbers only?

($a$) $y + 3$ ($b$) $(7 \times 20) - 8z$

($c$) $5(21 - 7) + 7 \times 2$

($d$) 5 ($e$) $3x$ ($f$) $5 - 5n$

($g$) $(7 \times 20) - (5 \times 10) - 45 + p$

**Sol.** ($a$) $y + 3$. This expression has variable '$y$'.

($b$) $(7 \times 20) - 8z$. This expression has a variable '$z$'.

($c$) $5(21 - 7) + 7 \times 2$. This expression has no variable. So it is with numbers only.

($d$) 5. This expression is with numbers only.

($e$) $3x$. This expression has a variable '$x$'.

($f$) $5 - 5n$. This expression has a variable '$n$'.

($g$) $(7 \times 20) - (5 \times 10) - 45 + p$. This expression has a variable '$p$'.

**Q3.** Identify the operations (addition, subtraction, division and multiplication) in forming the following expressions and tell how the expressions have been formed.

(*a*) $z + 1, z - 1, y + 17, y - 17$ (*b*) $17y, \frac{y}{17}, 5z$

(*c*) $2y + 17, 2y - 17$ (*d*) $7m, -7m + 3, -7m - 3$

**Sol.**

| Expressions | | Operations used | Formation of expression |
|---|---|---|---|
| (*a*) | (*i*) $z + 1$ | Addition | $z$ is increased by 1 |
| | (*ii*) $z - 1$ | Subtraction | $z$ is decreased by 1 |
| | (*iii*) $y + 17$ | Addition | $y$ is increased by 17 |
| | (*iv*) $y - 17$ | Subtraction | $y$ is decreased by 17 |
| (*b*) | (*i*) $17y$ | Multiplication | $y$ is multiplied by 17 |
| | (*ii*) $\frac{y}{17}$ | Division | $y$ is divided by 17 |
| | (*iii*) $5z$ | Multiplication | $z$ is multiplied by 5 |
| (*c*) | (*i*) $2y + 17$ | Multiplication and addition | $y$ is multiplied by 2 and then 17 is added. |
| | (*ii*) $2y - 17$ | Multiplication and subtraction | Twice of $y$ is decreased by 17 |
| (*d*) | (*i*) $7m$ | Multiplication | $m$ is multiplied by 7 |
| | (*ii*) $-7m + 3$ | Multiplication and addition | $m$ is multiplied by $-7$ and then increased by 3 |
| | (*iii*) $-7m - 3$ | Multiplication and subtraction | M is multiplied by $-7$ and then decreased by 3 |

**Q4.** Give expressions for the following cases:

(*a*) 7 added to $p$

(*b*) 7 subtracted from $p$

(*c*) $p$ multiplied by 7

(*d*) $p$ divided by 7

(*e*) 7 subtracted from $-m$

(*f*) $-p$ multiplied by 5

(*g*) $-p$ divided by 5

(*h*) $p$ multiplied by $-5$

**Sol.** (*a*) $p + 7$ (*b*) $p - 7$ (*c*) $7p$

(*d*) $\frac{p}{7}$ (*e*) $-m - 7$ (*f*) $-5p$

(*g*) $\frac{-p}{5}$ (*h*) $5p$

**Q5.** Give expressions in the following cases:

(*a*) 11 added to 2m

(*b*) 11 subtracted from 2m

(*c*) 5 times $y$ to which 3 is added

(*d*) 5 times $y$ from which 3 is subtracted

(*e*) $y$ is multiplied by $-8$

(*f*) $y$ is multiplied by $-8$ and then 5 is added to the result

(*g*) $y$ is multiplied by 5 and the result is subtracted from 16

(*h*) $y$ is multiplied by $-5$ and the result is added to 16.

**Sol.** (*a*) $2m + 11$ (*b*) $2m - 11$ (*c*) $5y + 3$

(*d*) $5y - 3$ (*e*) $-8y$ (*f*) $-8y + 5$

(*g*) $16 - 5y$ (*h*) $-5y + 16$

**Q6.** (*a*) Form expressions using $t$ and 4. Use not more than one number operation. Every expression must have $t$ in it.

(*b*) Form expressions using $y$, 2 and 7. Every expression must have $y$ in it. Use only two number operations. These should be different.

**Sol.** (*a*) The possible expressions are:

(*i*) $t + 4$ (*ii*) $t - 4$

(*iii*) $4t$ (*iv*) $\frac{t}{4}$

(*v*) $4 + t$ (*vi*) $4 + t$, etc.

(*b*) The possible expressions are:

(*i*) $2y + 7$ (*ii*) $7y - 2$

(*iii*) $7 - 2y$ (*iv*) $7y + 2$

(*v*) $\frac{7y}{2}$ (*vi*) $\frac{2y}{7}$

(*vii*) $\frac{y}{7} + 2$ (*viii*) $\frac{y}{2} - 7$, etc.

## EXERCISE 11.4

**Q1.** Answer the following:

(*a*) Take Sarita's present age to be *y* years.

(*i*) What will be her age 5 years from now?

(*ii*) What was her age 3 years back?

(*iii*) Sarita's grandfather is 6 times her age. What is the age of her grandfather?

(*iv*) Grandmother is 2 years younger than grandfather. What is grandmother's age?

(*v*) Sarita's father's age is 5 years more than 3 times Sarita's age. What is her father's age?

(*b*) The length of a rectangular hall is 4 metres less than 3 times the breadth of the hall. What is the length, if the breadth is *b* metres?

(*c*) A rectangular box has height *h* cm. Its length is 5 times the height and breadth is 10 cm less than the length. Express the length and the breadth of the box in terms of the height.

(*d*) Meena, Beena and Leena are climbing the steps to the hill top. Meena is at step *s*, Beena is 8 steps ahead and Leena 7 steps behind. Where are Beena and Meena? The total number of steps to the hill top is 10 less than 4 times what Meena has reached. Express the total number of steps using *s*.

(*e*) A bus travels at *v* km per hour. It is going from Daspur to Beespur. After the bus has travelled 5 hours, Beespur is still 20 km away. What is the distance from Daspur to Beespur? Express it using *v*.

**Sol.** (*a*) Sarita's age is given *y* years.

(*i*) After 5 years from now, her age will be $(y + 5)$ years.

(*ii*) 3 years back from now, she was $(y - 3)$ years of age.

(*iii*) Age of her grandfather = $6y$ years.

(*iv*) Age of her grandmother = $(6y - 2)$ years.

(*v*) Sarita's father's age = $(3y + 5)$ years.

(*b*) Let '*l*' be the length of the rectangular hall

$\therefore$ length = $(3b - 4)$ metre

Where *b* represents the breadth.

(*c*) Height of the rectangular box is '*h*'

$\therefore$ Length = $5h$ cm

and Breadth = $(5h - 10)$ cm.

(*d*) Meena is at step *s*.

$\therefore$ Beena is at $(s + 8)$ steps

and Leena is at $(s - 7)$ steps.

Total number of steps on to the hill top = $(4s - 10)$

(*e*) Distance travelled by Bus in 5 hours = $5v$ km.

$\therefore$ Distance from Daspur to Beespur = $(5v + 20)$ km.

**Q2.** Change the following statements using expressions into statements in ordinary language.

(For example, Given Salim scores *r* runs in a cricket match, Nalin scores $(r + 15)$ runs. In ordinary language—Nalin scores 15 runs more than Salim.

(*a*) A notebook costs ₹ *p*. A book costs ₹ $3p$.

(*b*) Tony puts *q* marbles on the table. He has $8q$ marbles in his box.

(*c*) Our class has *n* students. The school has $20n$ students.

(*d*) Jaggu is *z* years old. His uncle is $4z$ years old and his aunt is $(4z - 3)$ years old.

(*e*) In an arrangement of dots there are *r* rows. Each row contains 5 dots.

**Sol.** (*a*) A book costs 3 times the cost of a notebook.

(*b*) Tony has 8 times the number of marbles put on the table by him.

(*c*) The school has 20 times the number of students in a class.

(*d*) Jaggu's uncle's age is 4 times his age and his aunt's age is 3 years less than the age of his uncle.

(*e*) Number of dots in a row is 5 times the number of rows.

**Q3.** (*a*) Given Mannu's age to be *x* years, Can you guess what $(x - 2)$ may show?

(**Hint :** Think of Mannu's younger brother) can you guess what $(x + 4)$ may now? What $(3x + 7)$ may show?

(*b*) Given Sara's age today to be *y* years. Think of her age in the future or in the past.

What will the following expression indicate?

$$y + 7, y - 3, y + 4\frac{1}{2}, y - 2\frac{1}{2}.$$

(*c*) Given *n* students in the class like football, what may $2n$ show? What may $\frac{n}{2}$ show? (Think of games other than football).

**Sol.** (*a*) Given that Mannu's age = *x* years.

$\therefore$ $(x - 2)$ years may be the age of her younger brother or younger sister.

$(x + 4)$ years show the age of her elder brother or elder sister.

$(3x + 7)$ years may be the age of her father, mother or uncle.

(*b*) $y$ represents the age of Sara in years.
$\therefore$ $y + 7$ shows her future age.
$y - 3$ shows her past age.
$y + 4\frac{1}{2}$ show her future age i.e., the age after four and half years.
$y - 2\frac{1}{2}$ shows her past age i.e., the age before two and half years.

(*c*) Number of students who like football = $n$
$\therefore$ $2n$ = twice the number of football players may like to play cricket.
and $\frac{n}{2}$ = half of the number of football players may like to play basket ball.

## EXERCISE 11.5

**Q1.** State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

(*a*) $17 = x + 7$ (*b*) $(t - 7) > 5$
(*c*) $\frac{4}{2} = 2$ (*d*) $(7 \times 3) - 19 = 8$
(*e*) $5 \times 4 - 8 = 2x$ (*f*) $x - 2 = 0$
(*g*) $2m < 30$ (*h*) $2n + 1 = 11$
(*i*) $7 = (11 \times 5) - (12 \times 4)$ (*j*) $7 = (11 \times 2) + p$
(*k*) $20 = 5y$ (*l*) $\frac{3q}{2} < 5$
(*m*) $z + 12 > 24$
(*n*) $20 - (10 - 5) = 3 \times 5$ (*o*) $7 - x = 5$

**Sol.** (*a*) $17 = x + 7$ is an equation with a variable $x$.
(*b*) $(t - 7) > 5$ is not an equation because it does not have '=' sign.
(*c*) $\frac{4}{2} = 2$ is not an equation because it has no variable.
(*d*) $(7 \times 3) - 19 = 8$ is not an equation because it has no variable.
(*e*) $5 \times 4 - 8 = 2x$ is an equation with a variable $x$.
(*f*) $x - 2 = 0$ is an equation with a variable $x$.
(*g*) $2m < 30$ is not an equation because it does not have '=' sign.
(*h*) $2n + 1 = 11$ is an equation with a variable $n$.
(*i*) $7 = (11 \times 5) - (12 \times 4)$ is not an equation because it does not have a variable.
(*j*) $7 = (11 \times 2) + p$ is an equation with a variable $p$.
(*k*) $20 = 5y$ is an equation with a variable $y$.
(*l*) $\frac{3q}{2} < 5$ is not an equation because it does not have '=' sign.
(*m*) $z + 12 > 24$ is not an equation because it does not have '=' sign.
(*n*) $20 - (10 - 5) = 3 \times 5$ is not an equation because it has no variable.
(*o*) $7 - x = 5$ is an equation with a variable $x$.

**Q2.** Complete the entries in the third column of the table.

| S. No. | Equation | Value of variable | Equations satisfied Yes /No |
|---|---|---|---|
| (*a*) | $10y = 80$ | $y = 10$ | |
| (*b*) | $10y = 80$ | $y = 8$ | |
| (*c*) | $10y = 80$ | $y = 5$ | |
| (*d*) | $4l = 20$ | $l = 20$ | |
| (*e*) | $4l = 20$ | $l = 80$ | |
| (*f*) | $4l = 20$ | $l = 5$ | |
| (*g*) | $b + 5 = 9$ | $b = 5$ | |
| (*h*) | $b + 5 = 9$ | $b = 9$ | |
| (*i*) | $b + 5 = 9$ | $b = 4$ | |
| (*j*) | $h - 8 = 5$ | $h = 13$ | |
| (*k*) | $h - 8 = 5$ | $h = 8$ | |
| (*l*) | $h - 8 = 5$ | $h = 0$ | |
| (*m*) | $p + 3 = 1$ | $p = 3$ | |
| (*n*) | $p + 3 = 1$ | $p = 1$ | |
| (*o*) | $p + 3 = 1$ | $p = 0$ | |
| (*p*) | $p + 3 = 1$ | $p = -1$ | |
| (*q*) | $p + 3 = 1$ | $p = -2$ | |

**Sol.**

| S. No. | Equation | Value of variable | Equations satisfied Yes /No |
|---|---|---|---|
| (*a*) | $10y = 80$ | $y = 10$ | No |
| (*b*) | $10y = 80$ | $y = 8$ | Yes |
| (*c*) | $10y = 80$ | $y = 5$ | No |
| (*d*) | $4l = 20$ | $l = 20$ | No |
| (*e*) | $4l = 20$ | $l = 80$ | No |
| (*f*) | $4l = 20$ | $l = 5$ | Yes |
| (*g*) | $b + 5 = 9$ | $b = 5$ | No |
| (*h*) | $b + 5 = 9$ | $b = 9$ | No |
| (*i*) | $b + 5 = 9$ | $b = 4$ | Yes |
| (*j*) | $h - 8 = 5$ | $h = 13$ | Yes |

| | | | |
|---|---|---|---|
| (k) | $h - 8 = 5$ | $h = 8$ | No |
| (l) | $h - 8 = 5$ | $h = 0$ | No |
| (m) | $p + 3 = 1$ | $p = 3$ | No |
| (n) | $p + 3 = 1$ | $p = 1$ | No |
| (o) | $p + 3 = 1$ | $p = 0$ | No |
| (p) | $p + 3 = 1$ | $p = -1$ | No |
| (q) | $p + 3 = 1$ | $p = -2$ | Yes |

Q3. Pick out the solution from the values given in the brackets next to each equation. Show that the other values do not satisfy the equation.

(a) $5m = 60$ (10, 5, 12, 15)

(b) $n + 12 = 20$ (12, 8, 20, 0)

(c) $p - 5 = 5$ (0, 10, 5, –5)

(d) $\frac{q}{2} = 7$ (7, 2, 10, 14)

(e) $r - 4 = 0$ (4, –4, 8, 0)

(f) $x + 4 = 2$ (–2, 0, 2, 4)

Sol. (a) For $m = 10$, LHS = $5 \times 10 = 50$, RHS = 60

Here, LHS ≠ RHS

$\therefore$ $m = 10$ is not the solution of the equation

For $m = 5$, LHS = $5 \times 5 = 25$, RHS = 60

Here, LHS ≠ RHS

$\therefore$ $m = 5$ is not the solution of the equation

For $m = 12$, LHS = $5 \times 12 = 60$, RHS = 60

Here, LHS = RHS

$\therefore$ $m = 12$ is the solution of the equation

For $m = 15$ LHS = $5 \times 15 = 75$, RHS = 60

Here, LHS ≠ RHS

$\therefore$ $m = 15$ is not the solution of the equation

(b) $n + 12 = 20$ (12, 8, 20, 0)

For $n = 12$, LHS = $12 + 12 = 24$, RHS = 20

Here, LHS ≠ RHS

$\therefore$ $n = 12$ is not the solution of the equation

For $n = 8$, LHS = $8 + 12 = 20$, RHS = 20

Here, LHS = RHS

$\therefore$ $n = 8$ is the solution of the equation

For $n = 20$, LHS = $20 + 12 = 32$, RHS = 20

Here, LHS ≠ RHS

$\therefore$ $n = 20$ is not the solution of the equation

For $n = 0$, LHS = $0 + 12 = 12$, RHS = 20

Here, LHS ≠ RHS

$\therefore$ $n = 0$ is not the solution of the equation

(c) $p - 5 = 5$ (0, 10, 5, –5)

For $p = 0$, LHS = $0 - 5 = -5$, RHS = 5

Here, LHS ≠ RHS

$\therefore$ $p = 0$ is not the solution of the equation

For $p = 10$, LHS = $10 - 5 = 5$, RHS = 5

Here, LHS = RHS

$\therefore$ $p = 10$ is the solution of the equation

For $p = 5$, LHS = $5 - 5 = 0$, RHS = 5

Here LHS ≠ RHS

$\therefore$ $p = 5$ is not the solution of the equation

For $p = -5$, LHS = $-5 - 5 = -10$, RHS = 5

Here, LHS ≠ RHS

$\therefore$ $p = -5$ is not the solution of the equation

(d) $\frac{q}{2} = 7$ (7, 2, 10, 14)

For $q = 7$, LHS = $\frac{7}{2}$, RHS = 7

Here LHS ≠ RHS

$\therefore$ $q = 7$ is not the solution of the equation

For $q = 2$, LHS = $\frac{2}{2} = 1$, RHS = 7

Here, LHS ≠ RHS

$\therefore$ $q = 2$ is not the solution of the equation

For $q = 10$, LHS = $\frac{10}{2} = 5$, RHS = 7

Here, LHS ≠ RHS

For $q = 14$, LHS = $\frac{14}{2} = 7$, RHS = 7

Here, LHS = RHS

$\therefore$ $q = 14$ is the solution of the equation

(e) $r - 4 = 0$ (4, –4, 8, 0)

For $r = 4$, LHS = $4 - 4 = 0$, RHS = 0

Here, LHS = RHS

$\therefore$ $r = 4$ is the solution of the equation

For $r = -4$, LHS = $-4 - 4 = -8$, RHS = 0

Here, LHS ≠ RHS

$\therefore$ $r = -4$ is not the solution of the equation

For $r = 8$, LHS = $8 - 4 = 4$, RHS = 0

Here, LHS ≠ RHS

$\therefore$ $r = 8$ is not the solution of the equation

For $r = 0$, LHS = $0 - 4 = -4$, RHS = 0

Here, LHS ≠ RHS

$\therefore$ $r = 0$ is not the solution of the equation

(f) $x + 4 = 2$ (–2, 0, 2, 4)

For $x = -2$, LHS = $-2 + 4 = 2$, RHS = 2

Here, LHS = RHS

$\therefore$ $x = -2$ is the solution of the equation

For $x = 0$, LHS = $0 + 4 = 4$, RHS = 2

Here, LHS ≠ RHS

$\therefore$ $x = 0$ is not the solution of the equation

For $x = 2$, LHS = $2 + 4 = 6$, RHS = 2

Here, LHS ≠ RHS

$\therefore$ $x = 2$ is not the solution of the equation

For $r = 4$, LHS = $4 + 4 = 8$, RHS = 2

Here, LHS ≠ RHS

$\therefore$ $x = 4$ is not the solution of the equation

**Q4.** (*a*) Complete the table and by inspection of the table find the solution to the equation $m + 10 = 6$

| $m$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| $m + 10$ | – | – | – | – | – | – | – | – | – | – |

(*b*) Complete the table and by inspection of the table find the solution to the equation $5t = 35$

| $t$ | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|
| $5t$ | – | – | – | – | – | – | – | – | – |

(*c*) Complete the table and find the solution of the equation $\frac{z}{3} = 4$ using the table.

| $z$ | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| $\frac{z}{3}$ | $2\frac{2}{3}$ | 3 | $3\frac{1}{3}$ | – | – | – | – | – | – |

(*d*) Complete the table and find the solution to the equation $m - 7 = 3$

| $m$ | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|
| $m - 7$ | – | – | – | – | – | – | – | – | – |

**Sol.** (*a*) By inspections, we have

| $m$ | 1 | 2 | 3 | 4 | 5 | (6) | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| $m + 10$ | 11 | 12 | 13 | 14 | 15 | (16) | 17 | 18 | 19 | 20 |

So, $m = 6$ is the solution of the equation.

(*b*) Given that $5t = 35$

| $t$ | 3 | 4 | 5 | 6 | (7) | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|
| $5t$ | $5 \times 3 = 15$ | $5 \times 4 = 20$ | $5 \times 5 = 25$ | $5 \times 6 = 30$ | $5 \times 7 = (35)$ | $5 \times 8 = 40$ | $5 \times 9 = 45$ | $5 \times 10 = 50$ | $5 \times 11 = 55$ |

So, $t = 7$ is the solution of the equation.

(*c*) Given that $\frac{z}{3} = 4$

| $z$ | 8 | 9 | 10 | 11 | (12) | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| $\frac{z}{3}$ | $\frac{8}{3} = 2\frac{2}{3}$ | $\frac{9}{3} = 3$ | $\frac{10}{3} = 3\frac{1}{3}$ | $\frac{11}{3} = 3\frac{2}{3}$ | $\frac{12}{3} = (4)$ | $\frac{13}{3} = 4\frac{1}{3}$ | $\frac{14}{3} = 4\frac{2}{3}$ | $\frac{15}{3} = 5$ | $\frac{16}{3} = 5\frac{1}{3}$ |

So, $z = 12$ is the solution of the equation.

(*d*) Given that $m - 7 = 3$

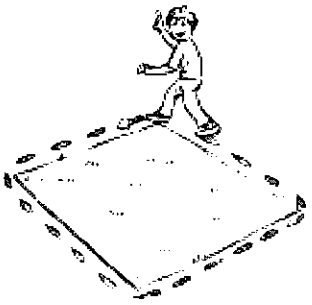
| $m$ | 5 | 6 | 7 | 8 | 9 | (10) | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|
| $m - 7$ | $5 - 7 = -2$ | $6 - 7 = -1$ | $7 - 7 = 0$ | $8 - 7 = 1$ | $9 - 7 = 2$ | $10 - 7 = 3$ | $11 - 7 = 4$ | $12 - 7 = 5$ | $13 - 7 = 6$ |

So, $m = 10$ is the solution of the equation.

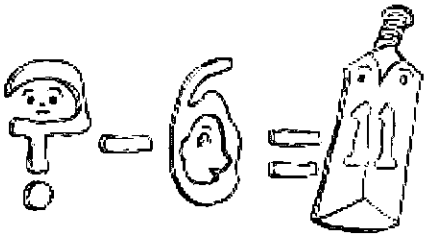
**Q5.** Solve the following riddles, you may yourself construct such riddles.

Who am I?

(*i*) Go round a square
Counting every corner
Thrice and no more!
Add the count to me
To get exactly thirty four!



(*ii*) For each day of the week
Make an upcount from me
If you make no mistake
you will get twenty three!



(*iii*) I am a special number
Take away from me a six!
A whole cricket team
You will still be able to fix!

(*iv*) Tell me who I am
I shall give you a pretty clue!
you will get me back
If you take me out of twenty two!

**Sol.** (*i*) According to the condition,

$$I + 12 = 34$$

or $x + 12 = 34$

$\therefore$ By inspection, we have

$22 + 12 = 34$

So, I am 22.

(*ii*) Let I am '$x$'.

We know that there are 7 days in a week.

$\therefore$ upcounting from $x$ for 7, the sum = 23

By inspections, we have

$16 + 7 = 23$

$\therefore \quad x = 16$

Thus I am 16.

(*iii*) Let the special number be $x$ and there are 11 players in cricket team.

$\therefore$ Special Number $-6 = 11$

$\therefore \quad x - 6 = 11$

By inspection, we get

$17 - 6 = 11$

$\therefore \quad x = 17$

Thus I am 17.

(*iv*) Suppose I am '$x$'.

$\therefore \quad 22 - I = I$

or $22 - x = x$

By inspection, we have

$22 - 11 = 11$

$\therefore \quad x = 11$

Thus I am 11.

## Learning More Q & A

### I. Very Short Answer (VSA) Questions

**Q1.** Six less than a number equals to two. What is the number?

**Sol.** Let the number be '$x$'.

According to condition, we have

$x - 6 = 2$

By inspections, we have

$8 - 6 = 2 \quad \therefore \quad x = 8$

Thus, the required number is 8.

**Q2.** Write an algebraic expression for each of the following:

(*a*) 3 subtracted from a number $y$.

(*b*) 5 is added to three times a number $x$.

**Sol.** (*a*) The required expression is $y - 3$

(*b*) The required expression is $5 + 3x$

**Q3.** Write an algebraic expression for the following expressions:

(*a*) The sum of a number $x$ and 4 is doubled.

(*b*) One fourth of a number $x$ is added to one third of the same number.

**Sol.** (*a*) The required expression is $2 \times (x + 4)$

(*b*) The required expression is $\frac{1}{4}x + \frac{1}{3}x$

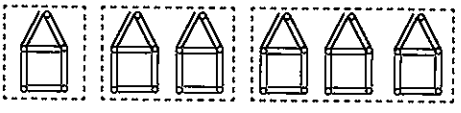
**Q4.** Think of a number $x$. Multiply it by 3 and add 5 to the product and subtract $y$ subsequently. Find the resulting number.

**Sol.** Required number is $(3x + 5)$

Now we have to subtract $y$ from the result

i.e., $3x + 5 - y$

**Q5.** Here is a pattern of houses with matchsticks:



Write the general rule for this pattern.

**Sol.** One house is made of 6 matchsticks i.e. $6 \times 1$

Two houses are made of 12 matchsticks i.e. $6 \times 2$

Three houses are made of 18 matchsticks i.e. $6 \times 3$

$\therefore$ Rule is $6n$ where $n$ represents the number of houses.

**Q6.** If the side of an equilateral triangle is $x$, find its perimeter.

**Sol.** We know that the three sides of an equilateral triangle are equal.

$\therefore \quad x + x + x = 3x.$

Thus, the required perimeter $= 3x$ units

**Q7.** If $x = 3$, find the value of the following:

(*i*) $x + 5$ (*ii*) $2x - 3$

(*iii*) $x - 7$ (*iv*) $\frac{x}{3} - 1$

**Sol.** Given that $x = 3$

(*i*) $x + 5 = 3 + 5 = 8$

(*ii*) $2x - 3 = 2 \times 3 - 3 = 6 - 3 = 3$

(*iii*) $x - 7 = 3 - 7 = -4$

(*iv*) $\frac{x}{3} - 1 = \frac{3}{3} - 1 = 1 - 1 = 0$

**Q8.** If $x = 2, y = 3$ and $z = 5$, find the value of;

(*a*) $2x + y + z$ (*b*) $4x - y + z$

(*c*) $x - y + z$

**Sol.** (*a*) Given that: $x = 2, y = 3$ and $z = 5$

$\therefore 2x + y + z = 2 \times 2 + 3 + 5 = 4 + 3 + 5 = 12$

(*b*) $4x - y + z = 4 \times 2 - 3 + 5$

$= 8 - 3 + 5 = 5 + 5 = 10$

(*c*) $x - y + z = 2 - 3 + 5 = -1 + 5 = 4$

**Q9.** State which of the following are equations with a variable?

(*a*) $12 = x - 5$ (*b*) $2x > 7$

(*c*) $\frac{x}{2} = 5$ (*d*) $5 + 7 = 3 + 9$

(*e*) $7 = (11 \times 5) - (12 \times 4)$

**Sol.** (*a*) $12 = x - 5$ is an equation with a variable $x$.

(*b*) $2x > 7$ is not an equation because it does not have '=' sign.

(*c*) $\frac{x}{2} = 5$ is an equation with a variable $x$.

(*d*) $5 + 7 = 3 + 9$ is not an equation because it has no variable.

(*e*) $7 = (11 \times 5) - (12 \times 4)$ is not an equation because it has no variable.

**Q10.** Think of a number, add 2 to it and then multiply the sum by 6, the result is 42.

**Sol.** Let the number be $x$.

$\therefore$ Sum of $x$ and $2 = x + 2$

Now by multiplying the sum by 6, we get

$$6 \times (x + 2) = 42$$

$$\Rightarrow \quad 6 \times x + 6 \times 2 = 42$$

$$\Rightarrow \quad 6x + 12 = 42$$

By inspection, we get

$$6 \times 5 + 12 = 42$$

$$\Rightarrow \quad 30 + 12 = 42$$

$$\therefore \quad 42 = 42$$

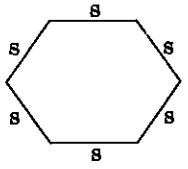
So, the required number = 5

## II. Short Answer (SA) Questions

**Q11.** The side of a regular hexagon is $s$ cm. Find its perimeter.

**Sol.** Each side of a regular hexagon $= s$

$\therefore$ its perimeter $= s + s + s + s + s + s = 6s$ cm




**Q12.** If $a = 3, b = \frac{1}{2}$ and $c = \frac{1}{4}$, find the value of $\frac{2ab - bc}{3ac}$.

**Sol.** Given that $a = 3, b = \frac{1}{2}$ and $c = \frac{1}{4}$

$$\therefore \quad \frac{2ab - bc}{3ac} = \frac{2 \times 3 \times \frac{1}{2} - \frac{1}{2} \times \frac{1}{4}}{3 \times 3 \times \frac{1}{4}}$$

$$= \frac{\frac{6}{2} - \frac{1}{8}}{\frac{9}{4}} = \frac{\frac{6 \times 4}{2 \times 4} - \frac{1 \times 1}{8 \times 1}}{\frac{9}{4}}$$

$$= \frac{\frac{24 - 1}{8}}{\frac{9}{4}} = \frac{23}{8} \times \frac{4}{9} = \frac{23}{2 \times 9} = \frac{23}{18}$$

**Q13.** Complete the table and find the solution of the equation $19 - x = 13$

| $x$ | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | ---- |
|---|---|---|---|---|---|---|---|---|---|---|
| $19 - x$ | | | | | | | | | | |

**Sol.** By inspection, we have

| $x$ | 2 | 3 | 4 | 5 | (6) | 7 | 8 | 9 | 10 | ---- |
|---|---|---|---|---|---|---|---|---|---|---|
| $19 - x$ | 17 | 16 | 15 | 14 | (13) | 12 | 11 | 10 | 9 | ---- |

Thus, the required solution is 6.

**Q14.** If $x = -\frac{1}{2}, y = \frac{1}{4}$ and $z = 0$, find the value of the given expressions

(a) $8z + 2x - y$ (b) $z - y + 3x$

**Sol.** (a) $8z + 2x - y = 8 \times 0 + 2\left(-\frac{1}{2}\right) - \frac{1}{4}$

$= 0 - 1 - \frac{1}{4}$

$= \frac{-1 \times 4 - 1 \times 1}{4} = \frac{-4 - 1}{4} = \frac{-5}{4}$

(b) $z - y + 3x = 0 - \frac{1}{4} + 3\left(-\frac{1}{2}\right)$

$= 0 - \frac{1}{4} - \frac{3}{2} = \frac{-1 \times 1}{4 \times 1} - \frac{3 \times 2}{2 \times 2}$

$= \frac{-1 - 6}{4} = \frac{-7}{4}$

**Q15.** Fill in the blanks:

(a) 5 added to $-5$ = .....

(b) If $x = 3$, then $3x - 5$ = .....

(c) If $x = 1$ and $y = 2$, then $2x + 3y$ = .....

(d) If $10x - 6 = 14$, then $x$ = .....

(e) 4 less than a number $x$ = .....

**Sol.** (a) 0 (b) 4 (c) 8

(d) 2 (e) $x - 4$

### III. Higher Order Thinking Skills (HOTS) Questions

**Q16.** A starts his car from Delhi at 6.00 am to Amritsar. The uniform speed of his car is $x$ km/h. At 12.00 noon, he finds that he is still 50 km away from Amritsar. Find the distance between Delhi and Amritsar.

**Sol.** Time taken by A to reach Amritsar

= 12.00 noon – 6.00 am = 6 hour.

The uniform speed of the car = $x$ km/hr

$\therefore$ Total distance covered by A

= Time × speed = $6x$ km.

$\therefore$ Distance between Delhi and Amritsar

= $(6x + 50)$ km

**Q17.** Anshika's Score in Science is 15 more than the two-third of her score in Sanskrit. If she scores $x$ marks in Sanskrit, find her score in Science.

**Sol.** Anshika's score in Sanskrit = $x$

$\therefore$ Her marks in Science = $\frac{2}{3}x + 15$

Thus, Anshika's score in Science = $\frac{2}{3}x + 15$

# Test Yourself

### I. Very Short Answer (VSA) Questions

**Q1.** If $a = -3$ and $b = 2$, find the value of the following:

(i) $2a - b$ (ii) $3a + 2b$

**Q2.** By inspection solve the following equations:

(a) $x + 20 = 70$ (b) $50 - x = 20$

**Q3.** Fill in the blanks:

(a) $3n = 21$, then variable is .....

(b) $2l + 3 = 7$, then variable is .....

(c) $3m - 5 = 6$, then variable is .....

**Q4.** State which are equations with one variable.

(a) $t - 2 > 5$ (b) $2 + 22 = 6 \times 4$

(c) $3x + 5 = 0$ (d) $20 = 5y$

**Q5.** Give expression in the following cases:

(a) 11 added to $2m$

(b) 8 subtracted from $3m$

(c) $y$ is multiplied by $-5$

(d) 5 times $y$ from which 3 is subtracted.

**Q6.** Answer the following questions:

(a) What is the age of Sarita after 10 years if her present age is $x$ years?

(b) What was the age of Ramesh 7 years before if his present age is $y$ years?

**Q7.** Complete the following table by inspection and find the solution of the equation $m + 11 = 16$.

| $m$ | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|
| $m + 11$ | – | – | – | – | – | – | – | – |

**Q8.** Pick out the solution from the values given in the brackets.

(a) $x - 6 = 0$ (3, 6, –6)

(b) $\frac{l}{3} = 3$ (–3, 0, 9)

**Q9.** Fill in the blanks.

(a) 9 is subtracted from _____ gives 7.

(b) _____ is added to $x$ to give $11 + x$.

(c) Half of a number $x$ is added to its one-third gives _____.

(d) $7 - y = 4$, then $y$ = _____

**Q10.** If $x = \frac{-1}{2}$ and $y = \frac{1}{2}$, find the value of:

(a) $2x - 4y$ (b) $6x + 2y$

### II. Short Answer (SA) Questions

**Q11.** If the cost of a chair is ₹ $x$ and the cost of a table is ₹ $y$, then find the value of 3 chairs and 4 tables.

**Q12.** Write in algebraic expression for each of the following:

($a$) $3m$ more than the quotient of $m$ by $n$.

($b$) 4 is added to four times of $x$.

($c$) 9 is subtracted from twice of $x$.

($d$) 3 multiplied by $y$ is added to 5.

**Q13.** If $x = 3$, $y = -3$, $z = 0$. Find the value of the following:

($a$) $x + y - z$ ($b$) $2x - y + 2z$

($c$) $\frac{1}{3}x - y + 2z$

**Q14.** Solve the following equations:

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

($c$) $3x + 7 = -2$

**Q15.** Five times $x$ is added to 3 times of $y$ is equal to 7. Write in algebraic expression.

## ANSWERS

1. ($i$) –8 ($ii$) –5
2. ($a$) 50 ($b$) 30
3. ($a$) $n$ ($b$) $l$ ($c$) $m$
4. ($c$), ($d$)
5. ($a$) $2m + 11$ ($b$) $3m - 8$
   ($c$) $-5y$ ($d$) $5y - 3$
6. ($a$) $(x + 10)$ years ($b$) $(y - 7)$ years
7. 5 8. ($a$) 6 ($b$) 9
9. ($a$) 16 ($b$) 11 ($c$) $\frac{x}{2} + \frac{x}{3}$ ($d$) 3
10. ($a$) –3 ($b$) –2 11. ₹$(3x + 4y)$
12. ($a$) $\frac{m}{n} + 3$ ($b$) $4x + 4$
    ($c$) $2x - 9$ ($d$) $5 + 3y$
13. ($a$) 0 ($b$) 9 ($c$) 4
14. ($a$) 12 ($b$) 14 ($c$) –3
15. $3y + 5x = 7$

# Internal Assessment

**Q1.** ($a$) If $x - 3 = 5$, then $x =$ ____

($b$) If $\frac{y}{2} = 2$, then $y =$ ____

($c$) If $3z - 5 = 4$, then $z =$ ____

($d$) If $x - 7 = -3$, then $x =$ ____

($e$) If 5 is added to twice of $x$, then the expression is ____

**Q2.** State True or False in the following statements:

($a$) $x - 2 > 5$ is an equation _____

($b$) $8 - 3 = 1 \times 5$ is not an equation _____

($c$) $2x + y = 5$ is an equation of one variable _____

($d$) $2x - 3 > 0$ is an equation _____

($e$) If $2m - 4 = 0$, then $m = -2$ _____

**Q3.** Solve the following equations:

($a$) $2x - 5 = 7$ ($b$) $x - 3 = 5$

($c$) $\frac{m}{2} = 5$ ($d$) $\frac{l}{3} - 1 = 8$

**Q4.** The variables in the algebraic terms $-5abc$ are;

($a$) $-5a$ and $c$ ($b$) $a$, $b$ and $c$

($c$) –5 ($d$) $ab$

**Q5.** If 9 on subtracting from $3x$ gives 15, then $x$ is equal to

($a$) –12 ($b$) 12 ($c$) 8 ($d$) –8

## ANSWERS

1. ($a$) 8 ($b$) 4
   ($c$) 3 ($d$) 4
   ($e$) $2x + 5$
2. ($a$) False ($b$) True
   ($c$) False ($d$) False
   ($e$) False
3. ($a$) 6 ($b$) 8
   ($c$) 10 ($d$) 27
4. ($b$) 5. ($c$)