CHAPTER – 11

ALGEBRA

EXERCISE – 11.1

Q. 1 Find the rule which gives the number of matchsticks required to make the following matchstick patterns. Use a variable to write the rule:

(a) A pattern of letter T as 
(b) A pattern of letter Z as 
(c) A pattern of letter U as 
(d) A pattern of letter V as 
(e) A pattern of letter E as 
(f) A pattern of letter S as 
(g) A pattern of letter A as 

Answer:

(a) 

From the above figure, it can be observed that the letter **T** will require 2 matchsticks

Therefore,

The pattern is 2n

(b) 

From the above figure, it can be observed that the letter **Z** will require 3 matchsticks

Therefore,

The pattern is 3n

(c) 

From the above figure, it can be observed that the letter **U** will require 3 matchsticks

Therefore,

The pattern is 3n

(d) 

From the above figure, it can be observed that the letter **V** will require 2 matchsticks

Therefore,

The pattern is 2n

(e) 

From the above figure, it can be observed that the letter **E** will require 5 matchsticks

Therefore,

The pattern is 5n

(f) 

From the above figure, it can be observed that the letter **S** will require 5 matchsticks

Therefore,

The pattern is 5n

(g) 

From the above figure, it can be observed that the letter **R** will require 6 matchsticks

Therefore,

The pattern is 6n

Q. 2 We already know the rule for the pattern of letters L, C and F. Some of the letters from Q. 1. (given above) give us the same rule as that given by L. Which are these? Why does this happen?

Answer:

We know that, the letter L requires 2 matchsticks

Therefore,

The pattern for L will be 2n

Now, if we look the letters given in the question 1 then there are only **T** and **V** which require only two matchsticks

Hence, T and V have same pattern as that of L.

Q. 3 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)

Answer:

Let us assume the number of rows will be n.

Also,

It is given in the question that:

Number of cadets in one row = 5

Therefore,

Total number of cadets = Number of cadets in a row × Number of rows

= n × 5

= 5n

Q. 4 If there are 50 mangoes in a box, how will you write the total number of boxes? (Use *b* for the number of boxes)

Answer:

Let us assume the number of boxes be "b".

Also, it is given in the question that:

Number of mangoes in a box = 50

Therefore,

Total number of mangoes = Number of mangoes in a box × Number of boxes

= b × 50

= 50b

Q. 5 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)

Answer:

Let us assume the number of students be s

Also,

It is given in the question that:

Number of pencil given to each student = 5

Therefore,

Total number of pencils = Number of pencil given to each student × Number of students

= 5 × s

= 5s

Q. 6 A bird flies 1 kilometres in one minute. Can you express the distance covered by the bird in terms of its flying time in minutes? (Use *t* for flying time in minutes)

Answer:

Let us assume the flying time be "t" minutes

Also,

Distance covered in 1 min = 1 km

Therefore, the distance covered in t minutes = Distance covered in one minute × Flying time

= 1 × t

= t km

Q. 7 Radhika is drawing a dot Rangoli (a beautiful pattern of lines joining dots with chalk powder). She has 9 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?

Answer:

It is given in the question that,

Number of dots in 1 row = 9

Also,

Number of rows = r

Therefore,

Total number of dots in r rows = Number of rows × Number of dots in a row

= 9 × r

= 9r

Hence,

Number of dots in 8 rows = 8 × 9 = 72

Also,

Number of dots in 10 rows = 10 × 9 = 90

Q. 8 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.

Answer:

Let us assume the age of Radha be x years

It is given in the question that,

Age of Leela = Age of Radha – 4

Therefore,

Leela's Age = (x – 4) years

Q. 9 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?

Answer:

It is given that,

Number of laddus given away = l

Also,

Number of laddus remaining = 5

Therefore,

Total number of laddus = Number fo laddus given away + Number of laddus remaining

= l + 5

Hence,

Total number of laddus be l + 5

Q. 10 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 in a smaller box are taken to be x, what is the number of oranges in the larger box?

Answer:

Given in the question that,

Number of oranges in one small box = x

Therefore,

Number of oranges in two small boxes = 2x

Also,

Total number of oranges left = 10

Hence,

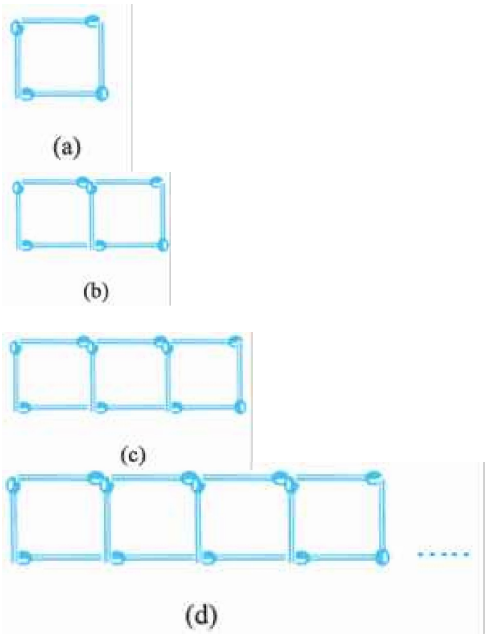
Number of oranges in the large box = Number of oranges in two small boxes + Number of oranges left

= 2x + 10

Therefore,

There will be 2x + 10 oranges in the large box.

Q. 11 A Look at the following matchstick pattern of squares (see figure). The squares are not separate. Two neighbouring squares have a common matchstick. Observe the pattern and find the rule that gives the number of matchsticks in terms of the number of squares.



Answer:

From the above-given figures, it can be observed that,

The number of matchsticks in the above-given pattern are 4, 7, 10 and 13 respectively.

$4 = 3(1) + 1$ $7 = 3(2) + 1$ $10 = 3(3) + 1$

i.e., The matchstick is 1 more than the thrice of the number of squares in the pattern

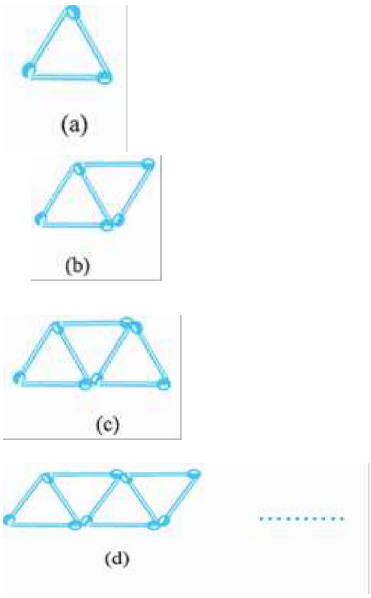
Hence,

The pattern for above-given figures will be:

$3n + 1$

Where n is the number of squares

Q. 11 B Figure gives a matchstick pattern of triangles. As in question 11 (a) above, find the general rule that gives the number of matchsticks in terms of the number of triangles.



Answer:

From the above given figures it can be observed that,

The number of matchsticks in the above given pattern are 3, 5, 7 and 9 respectively

i.e., The matchstick is 1 more than the twice of the number of triangles in the pattern

Hence,

The pattern for above given figures will be:

$2n + 1$

Where n is the number of triangles

EXERCISE – 11.2

Q. 1 The side of an equilateral triangle is shown by *l*. Express the perimeter of the equilateral triangle using *l*.

Answer:

It is given in the question that,

Side of equilateral triangle = l

We know that,

The perimeter of equilateral triangle = Sum of all sides of the triangle

Therefore,

Perimeter of the equilateral triangle = l + l + l

= 3l

Q. 2 The side of a regular hexagon is denoted by *l*. Express the perimeter of the hexagon using *l*.

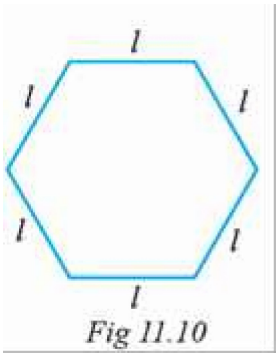


Fig 11.10

Answer:

It is given in the question that,

Side of regular hexagon = l

We know that,

Perimeter of regular hexagon = 6 × side

Therefore,

Perimeter of regular hexagon = 6 × l

= 6l

Q. 3 A cube is a three-dimensional figure as shown in the adjoining 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.

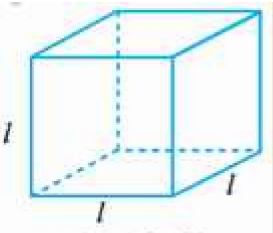


Fig 11.11

Answer:

It is given in the question that,

Length of edge of cube = l

Also,

Number of edges in the cube = 12

Therefore,

Total number of edges = Number of edges × Length of the edge

= 12 × l

= 12l

Q. 4 The diameter of a circle is a line segments 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).

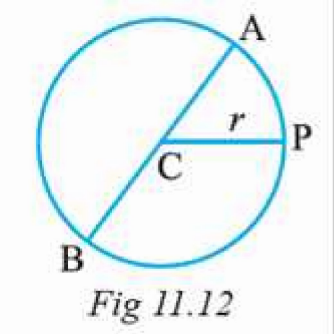


Fig 11.12

Answer:

Here,

In the given question,

We know that,

CP is the radius r of the circle

And,

AB is the diameter of the circle,

And,

C is the centre of the circle

We can also see that,

AB = 2CP

Hence,

We can say that,

The diameter of the circle is two times the radius of the circle.

Q. 5 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 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 variables *a, b* and *c.*

Answer:

Here,

Let us take any three numbers as a, b and c.

Now,

According to the question,

We have to express the associative property here

And,

We know that,

Associative property says that,

Among three numbers any two numbers added together and then the resultant added to the third one will give the same result.

We are given (14 + 27) + 13 = 14 + (27 + 13)
If we replace 14 with a , 27 with b and 13 with c we get,

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

EXERCISE – 11.3

Q. 1 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, subtraction and multiplication.

Answer:

In this question,

Most of the expressions can be formed by using the numbers 5, 7 and 8

Some of the examples of these expressions are as follows:

$5 \times (8 - 7)$

$5 \times (8 + 7)$

$(8 + 5) \times 7$

$(8 - 5) \times 7$

$(7 + 5) \times 8$

$(7 - 5) \times 8$

Q. 2 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) $(7 \times 20) - (5 \times 10) - 45 + p$

Answer:

from the given parts it is clear that:

(a), (b), (e), (f) and (g) are the expressions which have both letters and numbers

Whereas,

(c) and (d) are those expressions which are formed by using numbers only

Q. 3 Identify the operations (addition, subtraction, division, 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) $7m, -7m + 3, -7m - 3$

Answer:

(a) From the above given expression it is clear that:

Firstly,

Addition, as 1 is added to z

Then,

Subtraction, as 1 is subtracted from z

Then,

Addition, as 17 is added to y

At last,

Subtraction, as 17 is subtracted from y

(b) From the above-given expression, it is clear that:

Firstly,

Multiplication, as y is multiplied with 17

Then,

Division, as y is divided by 17

Then,

Multiplication as z is multiplied with 5

(c) From the above-given expression, it is clear that:

Firstly,

There is multiplication and addition as:

y is multiplied with 2 and 17 is added to the result

Then,

There are multiplication and subtraction as:

y is multiplied with 2 and 17 is subtracted from the result

(d) From the above-given expression, it is clear that:

Firstly,

Multiplication, as m is multiplied with 7

Then,

There are multiplication and addition as m is multiplied with -7 and 3 is added to the result

At last,

There are multiplication and subtraction as:

m is multiplied with -7 and 3 is subtracted from the result

Q. 4 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

Answer:

(a) The expression for the above given case is as follows:

$p + 7$

(b) The expression for the above given case is as follows:

$p - 7$

(c) The expression for the above given case is as follows:

$7 \times p = 7p$

(d) The expression for the above given case is as follows:

$\frac{P}{7}$

(e) The expression for the above given case is as follows:

$- m - 7$

(f) The expression for the above given case is as follows:

$- 5p$

(g) The expression for the above given case is as follows:

$-\frac{P}{5}$

(h) The expression for the above given case is as follows:

- 5p

Q. 5 Give expressions in the following cases:

(a) 11 added to 2*m*
(b) 11stbtracted 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

Answer:

(a) The expression for the above given case is as follows:

2m + 11

(b) The expression for the above given case is as follows:

2m – 11

(c) The expression for the above given case is as follows:

5y + 3

(d) The expression for the above given case is as follows:

5y – 3

(e) The expression for the above given case is as follows:

- 8y

(f) The expression for the above given case is as follows:

- 8y + 5

(g) The expression for the above given case is as follows:

16 – 5y

(h) The expression for the above given case is as follows:

- 5y + 16

Q. 6 A Form expressions using *t* and 4.

Use not more than one number operation.
Every expression must have *t* in it.

Answer:

The expressions for the above given case by using t and 4 is as follows:

t + 4

t – 4

4t

$= \frac{t}{4}$

$= \frac{4}{t}$

4 – t

4 + t

Q. 6 B Form expressions using *y*, 2 and 7. Every expression must have *y* in it. Use only two number operations. These should be different.

Answer:

The expressions for the above-given case by using y, 2 and 7 is as follows:

2y + 7, 2y – 7, 7y + 2…...

EXERCISE – 11.4

Q. 1 A Answer the following:

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 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?

Answer:

The answers of the parts are answered below:

(i) We know that,

Sarita's present age is y
Hence,

Sarita 's age five years from now will be = Sarita's present age + 5

= y + 5

(ii) We know that,

Sarita's present age is y

Hence,

Sarita's age three years ago will be = Sarita's present age – 3

= y – 3

(iii) We know that,

Sarita's present age is y

Hence,

Sarita's grandfather's age will be = Sarita's present age × 6

= 6y

(iv) We know that,

Grandfather's age is 6y

Hence,

Grandmother's age will be = Grandfather's age – 2

= 6y – 2

(v) We know that,

Sarita's present age is y

Hence,

Sarita's father's age = 5 + 3 × Sarita's present age

= 5 + (3 × y)

= 5 + 3y

Q. 1 B Answer the following:

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?

Answer:

According to the question,

We know that,

The breadth of the rectangular hall is b metres

Therefore,

Length of the rectangular hall = 3 × breadth – 4

l = (3 × b) – 4

l = 3b – 4

Hence,

The length will be (3b – 4) metres.

Q. 1 C Answer the following:

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.

Answer:

Here,

It is given in the question that,

The height of the rectangular box = h

Now,

We have to express the length and breadth in terms of height

Thus,

Let the length of the rectangular box be l

And,

The breadth of the rectangular box be b

Hence,

Length of the box = 5 × height

l = 5h cm

Breadth of the box = 5 × height – 10

b = (5h – 10) cm

Q. 1 D Answer the following:
Meena, Beena, and Leena are climbing the steps to the hilltop. 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 yop is 10 less than 4 times what Meena has reached. Express the total number of steps using s.

Answer:

Here,

According to the question,

We know that,

Meena is at step s

Now,

Step at which Beena is = (Step at which Meena is) + 8

= s + 8

And,

Step at which Leena is = (Step at which Meena is) – 7

= s – 7

Hence,

Total steps = 4 × (Step at which Meena is) – 10

= 4 × s – 10

= 4s – 10

Q. 1 E Answer the following:

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*.

Answer:

Here,

According to the question,

We know that,

Speed = v km/hr

Now,

We have to calculate the distance between Daspur to Beespur

So,

At first we need the distance travelled in 5 hours

Thus,

Distance traveled in five hours = 5 × v

= 5v

Hence,

The total distance between Daspur and Beespur = (dist. Travelled in 5 hours) + 20

= 5v + 20

Q. 2 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 Rsp. A book costs Rs 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.

Answer:

(a) Here,

In the given question,

We know that,

Cost of a notebook = Rs p

And,

Cost of book = Rs 3p

Hence,

We can clearly observe that,

A book costs three times the cost of a notebook.

(b) Here,

In the given question,

We know that,

Number of marbles Tony puts on the table = q

And,

Number of marbles Tony has in his box = 8q

Hence,

We can clearly observe that,

Tony's box contains 8times the number of marbles on the table.

(c) Here,

In the given question,

We know that,

Number of students in our class = n

And,

Total number of students in the school = 20n

Hence,

We can clearly observe that,

The total number of students in the school is 20 times the student in our class.

(d) Here,

In the given question,

We know that,

Age of Jaggu = z years

And,

Age of his uncle = 4z

And,

Age of his aunt = 4z - 3

Hence,

We can clearly observe that,

Jaggu's uncle is 4 times older than Jaggu.

And,

Jaggu's aunt is 3 years younger than his uncle.

(e) Here,

In the given question,

We know that,

Number of rows = r

And,

Number of dots in each row = 5

Hence,

We can clearly observe that,

The total number of dots is 5 times the number of rows.

Q. 3 A Given Munnu's age to be x years, can you guess what $(x - 2)$ may show?

Can you guess what $x + 4$ may show? What $(3x+7)$ may show?

Answer:

Here,

According to the question,

We can conclude that,

$(x - 2)$ represents that the person, whose age is $(x - 2)$ years, is two years younger to Munnu.

And,

(x + 4) represents that the person, whose age is (x + 4) years, is four years elder to Munnu.

And,

(3x + 7) represents that the person, whose age is (3x + 7) years, is elder to Munnu and his age is 7 years more than thrice the age of Munnu.

Q. 3 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 expressions indicate?

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

Answer:

At first,

In future,

Sara's age will be (y + n), after n years from now.

Now,

In past,

'n' years ago, Sara's age was (y – n).

Now,

According to the question,

We can conclude that,

(y + 7) represents that the person, whose age is (y + 7) years, is 7 years elder to Sara.

And,

(y -3) represents that the person, whose age is (y – 3) years, is 3 years younger than Sara.

And,

(y + $4\frac{1}{2}$) represents that the person, whose age is (y + $4\frac{1}{2}$) years, is $4\frac{1}{2}$ years elder to Sara.

And,

(y -$2\frac{1}{2}$) represents that the person, whose age is (y – $2\frac{1}{2}$) years, is $2\frac{1}{2}$ years younger than Sara.

Q. 3 C Given n students in the class like football, what may $2n$ show? What may show $\frac{n}{2}$?

Answer:

Here,

According to the question,

We can conclude that,

2n may represent the number of person who either likes football or some other game such as cricket

Whereas,

$\frac{n}{2}$ represents the number of students who like cricket, out of the total number of students who like either football or cricket.

EXERCISE – 11.5

Q. 1 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) $7 - x = 5$

Answer:

(a) $17 = x + 7$

From the above given equation we can see that it has "=" sign with a variable.

Hence it is an equation.

(b) $(t-7) > 5$

It does not have "=" sign.

It is not an equation.

(c) $\frac{4}{2} = 2$

From the above given equation we can see that it has "=" sign without a variable.

Hence it is not an equation with variable.

(d) 7 × 3 – 19 = 8

From the above given equation we can see that it has "=" sign without a variable.

Hence it is not an equation with variable.

(e) 5 × 4 – 8 = 2x

From the above given equation we can see that it has "=" sign with a variable.

Hence it is an equation.

(f) x – 2 = 0

From the above given equation we can see that it has "=" sign with a variable.

Hence it is an equation.

(g) 2m< 30

It does not have "=" sign.

It is not an equation.

(h) 2n + 1 = 11

From the above given equation we can see that it has "=" sign with a variable.

Hence it is an equation.

(i) 7 = (11×5) – (12×4)

From the above given equation we can see that it has "=" sign without a variable.

Hence it is not an equation with variable.

(j) 7 = (11×2) + p

From the above given equation we can see that it has "=" sign with a variable.

Hence it is an equation.

(k) 20 = 5y

From the above given equation we can see that it has "=" sign with a variable.

Hence it is an equation.

(l) $\frac{3q}{2} < 5$

It does not have "=" sign.

It is not an equation.

(m) z + 12 > 24

It does not have "=" sign.

It is not an equation.

(n) 20 – (10-5) = 3×5

From the above given equation we can see that it has "=" sign with a variable.

Hence it is an equation.

(o) 7 – x = 5

From the above given equation we can see that it has "=" sign with a variable.

Hence it is an equation.

Q. 2 Complete the entires in the third column of the table.

S. No.	Equation	Value of variable	Equation 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)	$p + 3 = 1$	$p = -2$	

Answer:

(a) 10 y = 80

We have,

10 y = 80

Now,

y = 10 is not a solution for the above given equation because:

When, y = 10

10 y = 10 × 10

$= 100$

And,

$100 \neq 80$

(b) 10 y = 80

We have,

$10y = 80$

Now,

$y = 8$ is a solution for the above given equation because:

When, $y = 8$

$10y = 10 \times 8$

$= 80$

And,

$80 = 80$

(c) 10 y = 80

We have,

$10y = 80$

Now,

$y = 5$ is not a solution for the above given equation because:

When, $y = 5$

$10y = 10 \times 5$

$= 50$

And,

$50 \neq 80$

(d) 4 l = 20

We have,

4 l = 20

Now,

l = 20 is not a solution for the above given equation because:

When, l = 20

4 l = 4 × 20

= 80

And,

80 ≠ 20

(e) 4 l = 20

We have,

4 l = 20

Now,

l = 80 is not a solution for the above given equation because:

When, l = 80

4 l = 4 × 80

= 320

And,

320 ≠ 20

(f) 4 l = 20

We have,

4 l = 20

Now,

l = 5 is a solution for the above given equation because:

When, l = 5

4 l = 4 × 5

= 20

And,

20 = 20

(g) b + 5 = 9

We have,

b + 5 = 9

Now,

b = 5 is not a solution for the above given equation because:

When, b = 5

b + 5 = 5 + 5

= 10

And,

10 ≠ 9

(h) b + 5 = 9

We have,

b + 5 = 9

Now,

b = 9 is not a solution for the above given equation because:

When, b = 9

b + 5 = 9 + 5

= 14

And,

$14 \neq 9$

(i) b + 5 = 9

We have,

$b + 5 = 9$

Now,

$b = 4$ is a solution for the above given equation because:

When, $b = 4$

$b + 5 = 5 + 4$

$= 9$

And,

$9 = 9$

(j) h - 8 = 5

We have,

$h - 8 = 5$

Now,

$h = 13$ is a solution for the above given equation because:

When, $h = 13$

$h - 8 = 13 - 8$

$= 5$

And,

$5 = 5$

(k) h - 8 = 5

We have,

h - 8 = 5

Now,

h = 8 is not a solution for the above given equation because:

When, h = 8

h - 8 = 8 - 8

= 0

And,

0 ≠ 5

(l)h - 8 = 5

We have,

h - 8 = 5

Now,

h = 0 is not a solution for the above given equation because:

When, h = 0

h - 8 = 0 - 8

= -8

And,

-8 ≠ 5

(m) p + 3 = 1

We have,

p + 3 = 1

Now,

p = 3 is not a solution for the above given equation because:

When, p = 3

$p + 3 = 3 + 3$

$= 6$

And,

$6 \neq 1$

(n)$p + 3 = 1$

We have,

$p + 3 = 1$

Now,

$p = 1$ is not a solution for the above given equation because:

When, $p = 1$

$p + 3 = 1 + 3$

$= 4$

And,

$4 \neq 1$

(o) We have,

$p + 3 = 1$

Now,

$p = 0$ is not a solution for the above given equation because:

When, $p = 0$

$p + 3 = 0 + 3$

$= 3$

And,

$3 \neq 1$

(p) p + 3 = 1

We have,

p + 3 = 1

Now,

p = -1 is not a solution for the above given equation because:

When, p = -1

p + 3 = - 1 + 3

= 2

And,

2 ≠ 1

(q) p + 3 = 1

We have,

p + 3 = 1

Now,

p = -2 is a solution for the above given equation because:

When, p = -2

p + 3 = - 2 + 3

= 1

And,

1 = 1

Therefore,

The equation is satisfied.

Q. 3 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)

Answer:

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

m = 10	m = 5	m = 12	m = 15
5 (10) = 60 50 = 60 Which is not true.	5(5) = 60 25 = 60 Which is not true.	5(12) = 60 60 = 60 Which is true.	5(15) = 60 75 = 60 Which is not true.

Hence m = 12 is the solution.

We have,

5m = 60

m = 12 is the solution for given equation as,

When m = 12

5m = 5 × 12

= 60

Hence, the equation is satisfied

m = 10 is not a solution to the given equation because:

When m = 5

$5m = 5 \times 5$

$= 25$

And, $25 \neq 60$

Also,

$m = 15$ is not a solution to the given equation because:

When $m = 15$

$5m = 5 \times 15$

$= 75$

And, $75 \neq 60$

(b) We have,

$n + 12 = 20$

$n = 8$ is the solution for given equation as,

When $n = 8$

$n + 12 = 8 + 12$

$= 20$

Hence, the equation is satisfied

$n = 12$ is not a solution to the given equation because:

When $n = 12$

$n + 12 = 12 + 12$

$= 24$

And, $24 \neq 20$

Also,

n = 20 is not a solution to the given equation because:

When n = 20

n + 12 = 20 + 12

= 32

And, $32 \neq 20$

n = 0 is not a solution to the given equation because:

When n = 0

n + 12 = 0 + 12

= 12

And, $12 \neq 20$

(c) We have,

p - 5 = 5

p = 10 is the solution for given equation as,

When p = 10

p - 5 = 10 - 5

= 5

Hence, the equation is satisfied

p = 0 is not a solution to the given equation because:

When p = 0

p - 5 = 0 - 5

= - 5

And, $-5 \neq 5$

Also,

p = 5 is not a solution to the given equation because:

When p = 5

p - 5 = 5 - 5

= 0

And, $0 \neq 5$

p = -5 is not a solution to the given equation because:

When p = -5

p - 5 = -5 - 5

= - 10

And, $-10 \neq 5$

(d) We have,

$\frac{q}{2} = 7$

q = 14 is the solution for given equation as,

When q = 14

$\frac{q}{2} = \frac{14}{2}$

= 7

Hence, the equation is satisfied

q = 7 is not a solution to the given equation because:

When q = 7

$\frac{q}{2} = \frac{7}{2}$

And, $\frac{7}{2} \neq 7$

Also,

q = 2 is not a solution to the given equation because:

When q = 2

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

= 1

And, $1 \neq 7$

q = 10 is not a solution to the given equation because:

When q = q0

$\frac{q}{2} = \frac{10}{2}$

= 5

And, $5 \neq 7$

(e) We have,

r - 4 = 0

r = 4 is the solution for given equation as,

When r = 4

r - 4 = 4 - 4

= 0

Hence, the equation is satisfied

r = - 4 is not a solution to the given equation because:

When r = - 4

r - 4 = - 4 - 4

= - 8

And, $- 8 \neq 0$

Also,

r = 8 is not a solution to the given equation because:

When r = 8

r - 4 = 8 - 4

= 4

And, $4 \neq 0$

r = 0 is not a solution to the given equation because:

When r = 0

r - 4 = 0 - 4

= - 4

And, $-4 \neq 0$

(f) We have,

x + 4 = 2

x = - 2 is the solution for given equation as,

When x = - 2

x + 4 = - 2 + 4

= 2

Hence, the equation is satisfied

x = 0 is not a solution to the given equation because:

When x = 0

x + 4 = 0 + 4

= 4

And, $4 \neq 2$

Also,

x = 2 is not a solution to the given equation because:

When x = 2

x + 4 = 2 + 4

= 6

And, 6 ≠ 2

x = 4 is not a solution to the given equation because:

When x = 4

x + 4 = 4 + 4

= 8

And, 8 ≠ 2

Q. 4 A Complete the table and by inspection of the table find the solution to the equation $m + 10 = 16$.

M	1	2	3	4	5	6	7	8	9	10	--	--	--
m +10	-	-	-	-	-	-	-	-	-	-	-	-	-

Answer:

For m + 10, the table can be formed as follows:

m	m + 10
1	1 + 10 = 11
2	2 + 10 = 12
3	3 + 10 = 13
4	4 + 10 = 14
5	5 + 10 = 15
6	6 + 10 = 16
7	7 + 10 = 17
8	8 + 10 = 18
9	9 + 10 = 19

From the above solution, we find that:

m = 6 is the solution of the given equation as

m + 10 = 6 + 10

= 16

Q. 4 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	-	-	-	-	-
$5t$	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Answer:

For 5t, the table can be formed as follows:

T	5t
3	5 × 3 = 15
4	5 × 4 = 20
5	5 × 5 = 25
6	5 × 6 = 30
7	5 × 7 = 35
8	5 × 8 = 40
9	5 × 9 = 45
10	5 × 10 = 50
11	5 × 11 = 55

From the above solution, we find that:

t = 7 is the solution of the given equation as

5t = 5 × 7

= 35

Q. 4 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	$3\frac{1}{3}$	-	-	-	-	-	-	-	-	-	-	-

Answer:

For $\frac{z}{3}$ the table can be formed as follows:

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

From the above solution, we find that:

z = 12 is the solution of the given equation as

For z = 12,

$\frac{z}{3} = 4$

Q. 4 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	-	-	-	-	-	-	-	-	-	-	-	-

Answer:

The table can be formed as follows:

m	**m – 7**	**Explanation**
5	5 – 7 = - 2	For m = 5, m – 7 = 5 – 7 = - 2
6	6 – 7 = - 1	For m = 6, m – 7 = 6 – 7 = - 1
7	7 – 7 = 0	For m = 7, m – 7 = 7 – 7 = 0
8	8 – 7 = 1	For m = 8, m – 7 = 8 – 7 = 1
9	9 – 7 = 2	For m = 9, m – 7 = 9 – 7 = 2
10	10 – 7 = 3	For m = 10, m – 7 = 10 – 7 = 3
11	11 – 7 = 4	For m = 11, m – 7 = 11 – 7 = 4
12	12 – 7 = 5	For m = 12, m – 7 = 12 – 7 = 5
13	13 – 7 = 6	For m = 13, m – 7 = 13 – 7 = 6

From the above solution, now we have to find the solution for: m - 7 = 3

This is the solution when m = 10 (in the table)

Thus, m = 10 is the solution of the given equation.

Q. 5 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 up count 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 a pretty clue !
You will get me back
If you take me out of twenty two !

Answer:

(i) From above riddle, we can conclude following:

We know that,

There are 4 corners in a square

Also,

Thrice the number of corners in the square will be $3 \times 4 = 12$

When 12 is added to the number than we get the result which is 34

Hence,

The number must be the difference of 34 and 12

i.e., $34 - 12 = 22$

(ii) From above riddle, we can conclude following:

When the old number was up counted on Sunday then the result was 23

Also,

When the old number was up counted on Saturday then the result was 22

When the old number was up counted on Friday then the result was 21

When the old number was up counted on Thursday then the result was 20

When the old number was up counted on Wednesday then the result was 19

When the old number was up counted on Tuesday then the result was 18

When the old number was up counted on Monday then the result was 17

Therefore,

Number taken at start = $17 - 1$

$= 16$

(iii) From above riddle, we can conclude following:

We know that,

Total players in a cricket team = 11

Therefore, according to the riddle the number is such that when 6 is subtracted from it the result is 11

Hence,

Required number = 11 + 6

= 17

(iv) From above riddle, we can conclude following:

According to the riddle the number is such that when it is subtracted from 22 then the result will be the number itself

Therefore,

The required number should be 11 which again gives 11 when it is subtracted from 22.