CHAPTER – 11

Algebra

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) $7 \times 3 - 19 = 8$

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

Hence it is not an equation with variable.

(e) $5 \times 4 - 8 = 2x$

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 80

(b) 10 y = 80

We have,

10 y = 80

Now,

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

When, y = 8

10 y = 10 × 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) $4l = 20$

We have,

$4l = 20$

Now,

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

When, $l = 20$

$4l = 4 \times 20$

$= 80$

And,

$80 \neq 20$

(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 ≠ 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) =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

$5m = 5 \times 12$

$= 60$

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 60

Also,

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

When m = 15

$5m = 5 \times 15$

$= 75$

And, 75 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, $24 \quad 20$

Also,

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

When $n = 20$

$n + 12 = 20 + 12$

$= 32$

And, $32 \quad 20$

$n = 0$ 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 5

Also,

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

When p = 5

p - 5 = 5 - 5

= 0

And, 0 ≠ 5

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

When p = -5

p - 5 = -5 - 5

= - 10

And, - 10 ≠ 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 ≠ 7

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

When q = q0

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

= 5

And, 5 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 ≠ 0

Also,

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

When r = 8

r - 4 = 8 - 4

= 4

And, 4 0

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

When r = 0

r - 4 = 0 - 4

= - 4

And, - 4 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

$5t = 5 \times 7$

$= 35$

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	$\frac{13}{3} = 4\frac{1}{3}$
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 – 5 = - 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