Exercise 11.5

Question 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) An equation with variable x

(b) An inequality

(c) No, it is a numerical equation.

(d) No, it is a numerical equation.

(e) An equation with variable x

(f) An equation with variable x

(g) An inequality

(h) An equation with variable n

(i) No, it is a numerical equation.

(j) An equation with variable p

(k) An equation with variable y

(l) An inequality

(m) An inequality

(n) No, it is a numerical equation.

(o) An equation with variable x

Question 2:

Complete the entries 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) $10y = 80$

$y = 10$ is not a solution to the given equation because for $y = 10$,

$10y = 10 \times 10 = 100$, and not 80

(b) $10y = 80$

$y = 8$ is a solution to the given equation because for $y = 8$,

$10y = 10 \times 8 = 80$ and hence, the equation is satisfied.

(c) $10y = 80$

$y = 5$ is not a solution to the given equation because for $y = 5$,

$10y = 10 \times 5 = 50$, and not 80

(d) $4l = 20$

$l = 20$ is not a solution to the given equation because for $l = 20$,

$4l = 4 \times 20 = 80$, and not 20

(e) $4l = 20$

$l = 80$ is not a solution to the given equation because for $l = 80$,

$4l = 4 \times 80 = 320$, and not 20

(f) $4l = 20$

$l = 5$ is a solution to the given equation because for $l = 5$,

$4l = 4 \times 5 = 20$ and hence, the equation is satisfied.

(g) $b + 5 = 9$

$b = 5$ is not a solution to the given equation because for $b = 5$,

$b + 5 = 5 + 5 = 10$, and not 9

(h) $b + 5 = 9$

$b = 9$ is not a solution to the given equation because for $b = 9$,

$b + 5 = 9 + 5 = 14$, and not 9

(i) $b + 5 = 9$

$b = 4$ is a solution to the given equation because for $b = 4$,

$b + 5 = 4 + 5 = 9$ and hence, the equation is satisfied.

(j) $h - 8 = 5$

$h = 13$ is a solution to the given equation because for $h = 13$,

$h - 8 = 13 - 8 = 5$ and hence, the equation is satisfied.

(k) $h - 8 = 5$

$h = 8$ is not a solution to the given equation because for $h = 8$,

$h - 8 = 8 - 8 = 0$, and not 5

(l) $h - 8 = 5$

$h = 0$ is not a solution to the given equation because for $h = 0$,

$h - 8 = 0 - 8 = -8$, and not 5

(m) $p + 3 = 1$

$p = 3$ is not a solution to the given equation because for $p = 3$,

$p + 3 = 3 + 3 = 6$, and not 1

(n) $p + 3 = 1$

$p = 1$ is not a solution to the given equation because for $p = 1$,

$p + 3 = 1 + 3 = 4$, and not 1

(o) $p + 3 = 1$

$p = 0$ is not a solution to the given equation because for $p = 0$,

$p + 3 = 0 + 3 = 3$, and not 1

(p) $p + 3 = 1$

$p = -1$ is not a solution to the given equation because for $p = -1$,

$p + 3 = -1 + 3 = 2$, and not 1

(q) $p + 3 = 1$

$p = -2$ is a solution to the given equation because for $p = -2$,

$p + 3 = -2 + 3 = 1$ and hence, the equation is satisfied.

Question 3:

Pick out the solution from the values given in the bracket 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) $5m = 60$

$m = 12$ is a solution to the given equation because for $m = 12$,

$5m = 5 \times 12 = 60$ and hence, the equation is satisfied.

$m = 10$ is not a solution to the given equation because for $m = 10$,

$5m = 5 \times 10 = 50$, and not 60

$m = 5$ is not a solution to the given equation because for $m = 5$,

$5m = 5 \times 5 = 25$, and not 60

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

$5m = 5 \times 15 = 75$, and not 60

(b) $n + 12 = 20$

$n = 8$ is a solution to the given equation because for $n = 8$,

$n + 12 = 8 + 12 = 20$ and hence, the equation is satisfied.

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

$n + 12 = 12 + 12 = 24$, and not 20

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

$n + 12 = 20 + 12 = 32$, and not 20

$n = 0$ is not a solution to the given equation because for $n = 0$,

$n + 12 = 0 + 12 = 12$, and not 20

(c) $p - 5 = 5$

$p = 10$ is a solution to the given equation because for $p = 10$,

$p - 5 = 10 - 5 = 5$ and hence, the equation is satisfied.

$p = 0$ is not a solution to the given equation because for $p = 0$,

$p - 5 = 0 - 5 = -5$, and not 5

$p = 5$ is not a solution to the given equation because for $p = 5$,

$p - 5 = 5 - 5 = 0$, and not 5

$p = -5$ is not a solution to the given equation because for $p = -5$,

$p - 5 = -5 - 5 = -10$, and not 5

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

$q = 14$ is a solution to the given equation because for $q = 14$,

$\frac{q}{2} = \frac{14}{2} = 7$ and hence, the equation is satisfied.

$q = 7$ is not a solution to the given equation because for $q = 7$,

$\frac{q}{2} = \frac{7}{2}$, and not 7

$q = 2$ is not a solution to the given equation because for $q = 2$,

$\frac{q}{2} = \frac{2}{2} = 1$, and not 7

$q = 10$ is not a solution to the given equation because for $q = 10$,

$\frac{q}{2} = \frac{10}{2} = 5$, and not 7

(e) $r - 4 = 0$

$r = 4$ is a solution to the given equation because for $r = 4$,

$r - 4 = 4 - 4 = 0$ and hence, the equation is satisfied.

$r = -4$ is not a solution to the given equation because for $r = -4$,

$r - 4 = -4 - 4 = -8$, and not 0

$r = 8$ is not a solution to the given equation because for $r = 8$,

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$r = 8$ is not a solution to the given equation because for $r = 8$,

$r - 4 = 8 - 4 = 4$, and not 0

$r = 0$ is not a solution to the given equation because for $r = 0$,

$r - 4 = 0 - 4 = -4$, and not 0

(f) $x + 4 = 2$

$x = -2$ is a solution to the given equation because for $x = -2$,

$x + 4 = -2 + 4 = 2$ and hence, the equation is satisfied

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

(c) Complete the table and find the solution of the equation 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	...
$m - 7$	–	–	–	–	–	–	–	–	–	–

Answer:

Answer:

(a) For $m + 10$, the table can be constructed 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

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

(c) Complete the table and find the solution of the equation 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	...
$m - 7$	–	–	–	–	–	–	–	–	–	–

Answer:

(a) For $m + 10$, the table can be constructed 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

10	10 + 10 = 20

By inspection, we can find that $m = 6$ is the solution of the above equation as for $m = 6$,

$m + 10 = 6 + 10 = 16$

(b) For $5t$, the table can be constructed as follows.

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

By inspection, we can find that $t = 7$ is the solution of the above equation as for $t = 7$, $5t = 5 \times 7 = 35$

(c) For $\frac{z}{3}$, the table can be constructed as follows.

(c) For $\frac{z}{3}$, the table can be constructed 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	$\frac{16}{3}=5\frac{1}{3}$

By inspection, we can find that $z = 12$ is the solution of the above equation as for $z = 12$, $\frac{z}{3} = 4$

(d) For $m - 7$, the table can be constructed as follows.

m	***m − 7***
5	5 − 7 = − 2
6	6 − 7 = − 1
7	7 − 7 = 0
8	8 − 7 = 1
9	9 − 7 = 2
10	10 − 7 = 3
11	11 − 7 = 4
12	12 − 7 = 5
13	13 − 7 = 6

By inspection, we can find that $m = 10$ is the solution of the above equation as for $m = 10$, $m - 7 = 10 - 7 = 3$

Question 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 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 a pretty clue!
You will get me back
If you take me out of twenty two!

Answer:

(i)There are 4corners in a square.

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

When this result, i.e. 12, is added to the number, it comes to be 34. Therefore, the number will be the difference of 34 and 12 i.e., $34 - 12 = 22$

(ii) 23 was the result when the old number was up counted on Sunday.

22 was the result when the old number was up counted on Saturday.

21 was the result when the old number was up counted on Friday.

20 was the result when the old number was up counted on Thursday.

19 was the result when the old number was up counted on Wednesday.
18 was the result when the old number was up counted on Tuesday.
17 was the result when the old number was up counted on Monday.
Therefore, number taken at the start = 17 − 1 = 16
(iii) In a cricket team, there are 11 players. Hence, the number is such that when 6 is subtracted from it, the result is 11. Therefore, the number is 11 + 6 = 17
(iv) The number is such that when it is subtracted from 22, the result is again the number itself. The number is 11, which again gives 11, when it is subtracted from 22.

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