

Exercise 11.5

1. State which of the following are equations (with a variable). Give reasons 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) $7 - x = 5$

- Ans.**
- (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) $\frac{1}{2} = 2$ 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 the '=' sign. (m) $z + 12 > 24$ is not an equation because it does not have the '=' 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.

2. 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)	$p + 3 = 1$	$p = -2$	

Ans.

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

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)

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

Here, $LHS \neq RHS$

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

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

Here, $LHS \neq RHS$

$\therefore m = 5$ 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, $LHS \neq RHS$

$\therefore m = 15$ 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, $LHS \neq RHS$

$\therefore n = 12$ 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, $LHS \neq RHS$

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

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

Here, $LHS \neq RHS$

$\therefore n = 0$ 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, $LHS \neq RHS$

$\therefore p = 0$ 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 $LHS \neq RHS$

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

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

Here, $LHS \neq RHS$

$\therefore p = -5$ 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 $LHS \neq RHS$

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

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

Here, $LHS \neq RHS$

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

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

Here, $LHS \neq RHS$

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, $LHS \neq RHS$

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

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

Here, $LHS \neq RHS$

For $r = 8$ is not the solution of the equation

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

Here, $LHS \neq RHS$

$\therefore r = 0$ 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 \neq RHS

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

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

Here, LHS \neq RHS

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

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

Here, LHS \neq RHS

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

4. (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 $g = 4$ 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	-	-	-	-	-	-	-	-	-

- Ans. (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	5×3 = 15	5×4 = 20	5×5 = 25	5×6 = 30	5×7 = 35	5×8 = 40	5×9 = 45	5×10 = 50	5×11 = 55

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

(c) Given that $\frac{z}{3} = 35$

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.

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

Ans.

(i) According to the condition,

$$I + 12 = 34 \text{ or } x + 12 = 34$$

∴ 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

$$16 + 7 = 23$$

$$\therefore x = 16$$

Thus I am 16.

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

\therefore Special Number - 6 = 11

$$\therefore x - 6 = 11$$

By inspection, we get

$$17 - 6 = 11$$

$$\therefore x = 17$$

Thus I am 17.

(iv) Suppose I am 'x'.

$$\therefore 22 - I = I$$

$$\text{or } 22 - x = x$$

By inspection, we have

$$22 - 11 = 11$$

$$\therefore x = 11$$

Thus I am 11.