EXERCISE 11.5 PAGE NO: 240

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 + 17
(b) (t – 7) > 5
(c) 4 / 2 = 2
(d) (7 × 3) – 19 = 8
(e) 5 × 4 – 8 = 2x
(f) x – 2 = 0
(g) 2m < 30
(h) 2n + 1 = 11
(i) 7 = (11 × 5) – (12 × 4)
(j) 7 = (11 × 2) + p
(k) 20 = 5y
(l) 3q/ 2 < 5
(m) z + 12 > 24
(n) 20 – (10 – 5) = 3 × 5
(o) 7 – x = 5

Solutions:

(a) An equation with variable x
(b) An inequality equation
(c) No, it's a numerical equation
(d) No, it's a numerical equation
(e) An equation with variable x
(f) An equation with variable x
(g) An inequality equation
(h) An equation with variable n
(i) No, it's a numerical equation
(j) An equation with variable p
(k) An equation with variable y
(l) An inequality equation
(m) An inequality equation
(n) No, it's a numerical equation
(o) An equation with variable x

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**	

Solutions:

(a) 10y = 80

y = 10 is not a solution for this equation because if y = 10,

10y = 10 × 10

= 100 and not 80

(b) 10y = 80

y = 8 is a solution for this equation because if y = 8,

10y = 10 × 8

= 80

∴ Equation satisfied

(c) 10y = 80

y = 5 is not a solution for this equation because if y = 5,

10y = 10 × 5

= 50 and not 80

(d) 4l = 20

l = 20 is not a solution for this equation because if l = 20,

4l = 4 × 20

= 80 and not 20

(e) 4l = 20

l = 80 is not a solution for this equation because if l = 80,

4l = 4 × 80

= 320 and 20

(f) 4l = 20

l = 5 is a solution for this eqaution because if l = 5,

4l = 4 × 5

= 20

∴ Equation satisfied

(g) b + 5 = 9

b = 5 is not a solution for this equation because if b = 5,

b + 5 = 5 + 5

= 10 and not 9

(h) b + 5 = 9

b = 9 is not a solution for this equation because if b = 9,

b + 5 = 9 + 5

= 14 and not 9

(i) b + 5 = 9

b = 4 is a solution for this equation because if b = 4,

b + 5 = 4 + 5

= 9

∴ Equation satisfied

(j) h – 8 = 5

h = 13 is a solution for this equation because if h = 13,

h – 8 = 13 – 8

= 5

∴ Equation satisfied

(k) h – 8 = 5

h = 8 is not a solution for this equation because if h = 8,

h – 8 = 8 – 8

= 0 and not 5

(l) h – 8 = 5

h = 0 is not a solution for this equation because if h = 0,

h – 8 = 0 – 8

= - 8 and not 5

(m) p + 3 = 1

p = 3 is not a solution for this equation because if p = 3,

p + 3 = 3 + 3

= 6 and not 1

(n) p + 3 = 1

p = 1 is not a solution for this equation because if p = 1,

p + 3 = 1 + 3

= 4 and not 1

(o) p + 3 = 1

p = 0 is not a solution for this equation because if p = 0,

p + 3 = 0 + 3

= 3 and not 1

(p) p + 3 = 1

p = -1 is not a solution for this equation because if p = - 1,

p + 3 = -1 + 3

= 2 and not 1

(q) p + 3 = 1

p = -2 is a solution for this equation because if p = -2,

p + 3 = -2 + 3

= 1

∴ Equation satisfied

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 **(12, 8, 20, 0)**
(c) p – 5 = 5 **(0, 10, 5 – 5)**
(d) q / 2 = 7 **(7, 2, 10, 14)**
(e) r – 4 = 0 **(4, -4, 8, 0)**
(f) x + 4 = 2 **(-2, 0, 2, 4)**

Solutions:

(a) 5m = 60

m = 12 is a solution for this equation because for m = 12,
5m = 5 × 12
= 60
∴ Equation satisfied

m = 10 is not a solution for this equation because for m = 10,
5m = 5 × 10
= 50 and not 60

m = 5 is not a solution for this equation because for m = 5,
5m = 5 × 5
= 25 and not 60

m = 15 is not a solution for this equation because for m = 15,
5m = 5 × 15
= 75 and not 60

(b) n + 12 = 20

n = 8 is a solution for this equation because for n = 8,
n + 12 = 8 + 12
= 20
∴ Equation satisfied

n = 12 is not a solution for this equation because for n = 12,
n + 12 = 12 + 12
= 24 and not 20

n = 20 is not a solution for this equation because for n = 20,
n + 12 = 20 + 12
= 32 and not 20

n = 0 is not a solution for this equation because for n = 0,
n + 12 = 0 + 12
= 12 and not 20

(c) p – 5 = 5

p = 10 is a solution for this equation because for p = 10,
p – 5 = 10 – 5
= 5
∴ Equation satisfied

p = 0 is not a solution for this equation because for p = 0,
p – 5 = 0 – 5
= -5 and not 5

p = 5 is not a solution for this equation because for p = 5,
p – 5 = 5 – 5
= 0 and not 5

p = -5 is not a solution for this equation because for p = -5,
p – 5 = -5 – 5
= - 10 and not 5

(d) q / 2 = 7
q = 14 is a solution for this equation because for q = 14,
q / 2 = 14 / 2
= 7
∴ Equation satisfied

q = 7 is not a solution for this equation because for q = 7,
q / 2 = 7 / 2 and not 7

q = 2 is not a solution for this equation because for q = 2,
q / 2 = 2 / 2
= 1 and not 7

q = 10 is not a solution for this equation because for q = 10,
q / 2 = 10 / 2
= 5 and not 7

(e) r – 4 = 0
r = 4 is a solution for this equation because for r = 4,
r – 4 = 4 – 4
= 0
∴ Equation satisfied

r = -4 is not a solution for this equation because for r = - 4,
r – 4 = - 4 – 4
= -8 and not 0

r = 8 is not a solution for this equation because for r = 8,
r – 4 = 8 – 4

= 4 and not 0

r = 0 is not a solution for this equation because for r = 0,
r – 4 = 0 – 4
= - 4 and not 0

(f) x + 4 = 2
x = -2 is a solution for this equation because for x = -2,
x + 4 = - 2 + 4
= 2
∴ Equation satisfied

x = 0 is not solution for this equation because for x = 0,
x + 4 = 0 + 4
= 4 and not 2

x = 2 is not a solution for this equation because for x = 2,
x + 4 = 2 + 4
= 6 and not 2

x = 4 is not a solution for this equation because for x = 4,
x + 4 = 4 + 4
= 8 and not 2

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	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

(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 z / 3 = 4 using the table.

z	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**--**	**--**	**--**	**--**
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	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

Solutions:

(a) For m + 10, the table is represented as below

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

Now, by inspection we may conclude that m = 6 is the solution of the above equation since, for m = 6,
m + 10 = 6 + 10 = 16

(b) For 5t, the table is represented as below

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

Now, by inspection we may conclude that t = 7 is the solution of the above equation since, for t = 7,
5t = 5 × 7 = 35

(c) For z / 3, the table is represented as below

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

16	16 / 3 = $5\frac{1}{3}$

Now, by inspection we may conclude that z = 12 is the solution of the above equation since for z = 12,
z / 3 = 4

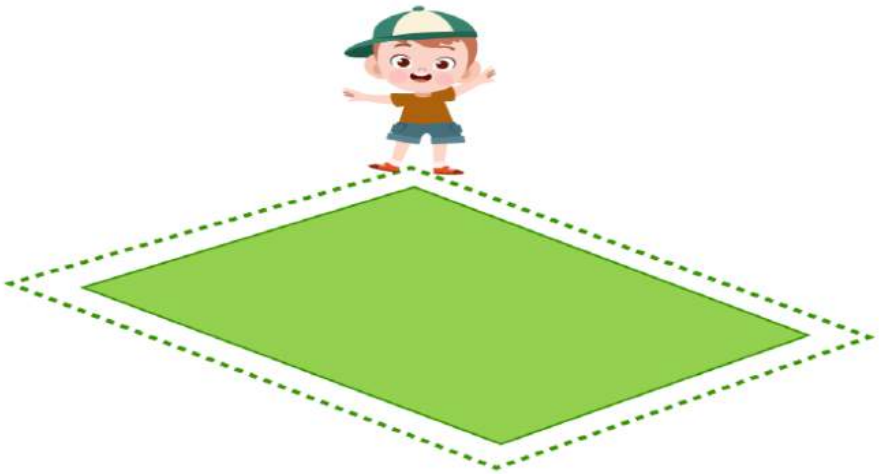
(d) For m – 7, the table is represented as below

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

Now, by inspection we may conclude that m = 10 is the solution of the above equation since, for m = 10,
m – 7 = 10 – 7 = 3

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!
Solutions:

(i) There are 4 corners in a square.
Thrice the number of corners in the square = 3 × 4 = 12
When 12 is added to the number it becomes 34
So, the number will be the difference of 34 and 12
34 – 12 = 22

(ii) The result was 23 when the old number was up counted on Sunday
The result was 22 when the old number was up counted on Saturday
The result was 21 when the old number was up counted on Friday
The result was 20 when the old number was up counted on Thursday
The result was 19 when the old number was up counted on Wednesday
The result was 18 when the old number was up counted on Tuesday
The result was 17 when the old number was up counted on Monday
`Hence, the number taken at starting was 17 – 1 = 16

(iii) There are 11 players in a cricket team
If 6 is subtracted from a required number it will be 11
11 + 6 = 17
Hence, the number is 17

(iv) The required number is such that if it is subtracted from 22 the result is the number itself.
The number is 11 because if it is subtracted from 22 the result will be 11 only.