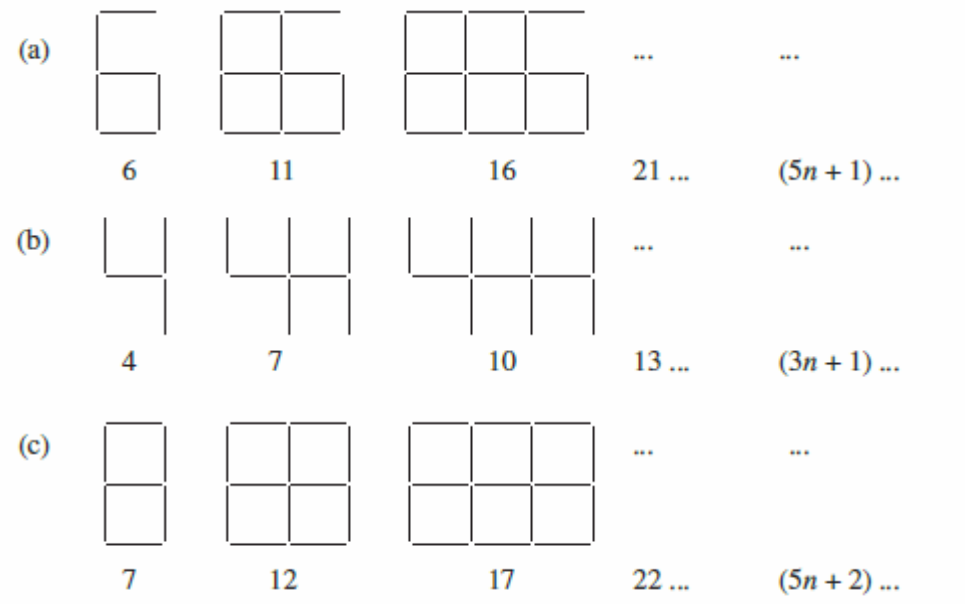
Access answers to Maths NCERT Solutions for Class 7 Chapter 12 – Algebraic Expressions Exercise 12.4

1. Observe the patterns of digits made from line segments of equal length. You will find such segmented digits on the display of electronic watches or calculators.



If the number of digits formed is taken to be n, the number of segments required to form n digits is given by the algebraic expression appearing on the right of each pattern. How many segments are required to form 5, 10, 100 digits of the kind

Solution:-

(a) From the question it is given that the numbers of segments required to form n digits of the kind

is (5n + 1)

Then,

The number of segments required to form 5 digits = ((5 × 5) + 1)

= (25 + 1)

= 26

The number of segments required to form 10 digits = ((5 × 10) + 1)

= (50 + 1)

= 51

The number of segments required to form 100 digits = ((5 × 100) + 1)

= (500 + 1)

= 501

(b) From the question it is given that the numbers of segments required to form n digits of the kind

is (3n + 1)

Then,

The number of segments required to form 5 digits = ((3 × 5) + 1)

= (15 + 1)

= 16

The number of segments required to form 10 digits = ((3 × 10) + 1)

= (30 + 1)

= 31

The number of segments required to form 100 digits = ((3 × 100) + 1)

= (300 + 1)

= 301

(c) From the question it is given that the numbers of segments required to form n digits of the kind

 is (5n + 2)

Then,

The number of segments required to form 5 digits = ((5 × 5) + 2)

= (25 + 2)

= 27

The number of segments required to form 10 digits = ((5 × 10) + 2)

= (50 + 2)

= 52

The number of segments required to form 100 digits = ((5 × 100) + 1)

= (500 + 2)

= 502

2. Use the given algebraic expression to complete the table of number patterns.

S. No.	Expression	Terms									
		1st	2nd	3rd	4th	5th	…	10th	…	100th	…
(i)	2n – 1	1	3	5	7	9	–	19	–	–	–
(ii)	3n + 2	5	8	11	14	–	–	–	–	–	–
(iii)	4n + 1	5	9	13	17	–	–	–	–	–	–
(iv)	7n + 20	27	34	41	48	–	–	–	–	–	–
(v)	$n^2 + 1$	2	5	10	17	–	–	–	–	10001	–

Solution:-

(i) From the table (2n – 1)

Then, 100^{th} term =?

Where n = 100

= (2 × 100) – 1

= 200 – 1

= 199

(ii) From the table (3n + 2)

5^{th} term =?

Where n = 5

= (3 × 5) + 2

= 15 + 2

= 17

Then, 10^{th} term =?

Where n = 10

= (3 × 10) + 2

= 30 + 2

= 32

Then, 100^{th} term =?

Where n = 100

= (3 × 100) + 2

= 300 + 2

= 302

(iii) From the table (4n + 1)

5^{th} term =?

Where n = 5

= (4 × 5) + 1

= 20 + 1

= 21

Then, 10^{th} term =?

Where n = 10

= (4 × 10) + 1

= 40 + 1

= 41

Then, 100^{th} term =?

Where n = 100

= (4 × 100) + 1

= 400 + 1

= 401

(iv) From the table (7n + 20)

5^{th} term =?

Where n = 5

= (7 × 5) + 20

= 35 + 20

= 55

Then, 10^{th} term =?

Where n = 10

= (7 × 10) + 20

= 70 + 20

= 90

Then, 100^{th} term =?

Where n = 100

= (7 × 100) + 20

= 700 + 20

= 720

(v) From the table (n^2 + 1)

5^{th} term =?

Where n = 5

= (5^2) + 1

= 25+ 1

= 26

Then, 10^{th} term =?

Where n = 10

= (10^2) + 1

= 100 + 1

= 101

So the table is completed below.

S. No.	**Expression**	**Terms**									
		1^{st}	**2^{nd}**	**3^{rd}**	**4^{th}**	**5^{th}**	**…**	**10^{th}**	**…**	**100^{th}**	**…**
(i)	2n – 1	1	3	5	7	9	–	19	–	199	–
(ii)	3n + 2	5	8	11	14	17	–	32	–	302	–
(iii)	4n + 1	5	9	13	17	21	–	41	–	401	–
(iv)	7n + 20	27	34	41	48	55	–	90	–	720	–
(v)	n^2 + 1	2	5	10	17	26	–	101	–	10001	–