

**CBSE Class –VII Mathematics**  
**NCERT Solutions**  
**Algebraic Expressions (Ex. 12.4)**

**Question 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.



11 16 21...  $(5n + 1) \dots$



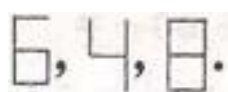
7 10 13...  $(3n + 1) \dots$



7 12 17 22...


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



**Answer:**

S. No.	Symbol	Digit's number	Pattern's Formulae	No. of Segments
(i)		5	$5n + 1$	26
		10		51
		100		501
(ii)		5	$3n + 1$	16
		10		31

		100		301
(iii)		5	$5n + 2$	27
		10		52
		100		502

(i)  $5n + 1$

Putting  $n = 5$ ,  $5 \times 5 + 1 = 25 + 1 = 26$

Putting  $n = 10$ ,  $5 \times 10 + 1 = 50 + 1 = 51$

Putting  $n = 100$ ,  $5 \times 100 + 1 = 500 + 1 = 501$

(ii)  $3n + 1$

Putting  $n = 5$ ,  $3 \times 5 + 1 = 15 + 1 = 16$

Putting  $n = 10$ ,  $3 \times 10 + 1 = 30 + 1 = 31$

Putting  $n = 100$ ,  $3 \times 100 + 1 = 300 + 1 = 301$

(iii)  $5n + 2$

Putting  $n = 5$ ,  $5 \times 5 + 2 = 25 + 2 = 27$

Putting  $n = 10$ ,  $5 \times 10 + 2 = 50 + 2 = 52$

Putting  $n = 100$ ,  $5 \times 100 + 2 = 500 + 2 = 502$

**Question 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)	$3n + 2$	2	5	8	11	---	---	---	---	---	---
(iii)	$4n + 1$	5	9	13	17	---	---	---	---	---	---
(iv)	$7n + 20$	27	34	41	48	---	---	---	---	---	---
(v)	$n^2 + 1$	2	5	10	17	---	---	---	---	10001	---

**Answer:** (i)  $2n - 1$

Putting  $n = 100$ ,  $2 \times 100 - 1 = 200 - 1 = 199$

(ii)  $3n + 2$

Putting  $n = 5$ ,  $3 \times 5 + 2 = 15 + 2 = 17$

Putting  $n = 10$ ,  $3 \times 10 + 2 = 30 + 2 = 32$

Putting  $n = 100$ ,  $3 \times 100 + 2 = 300 + 2 = 302$

(iii)  $4n + 1$

Putting  $n = 5$ ,  $4 \times 5 + 1 = 20 + 1 = 21$

Putting  $n = 10$ ,  $4 \times 10 + 1 = 40 + 1 = 41$

Putting  $n = 100$ ,  $4 \times 100 + 1 = 400 + 1 = 401$

(iv)  $7n + 20$

Putting  $n = 5$ ,  $7 \times 5 + 20 = 25 + 20 = 55$

Putting  $n = 10$ ,  $7 \times 10 + 20 = 70 + 20 = 90$

Putting  $n = 100$ ,  $7 \times 100 + 20 = 700 + 20 = 720$

(v)  $n^2 + 1$

Putting  $n = 5$ ,  $5 \times 5 + 1 = 25 + 1 = 26$

Putting  $n = 10$ ,  $10 \times 10 + 1 = 100 + 1 = 101$

Putting  $n = 100$ ,  $100 \times 100 + 1 = 10000 + 1 = 10001$

Now complete table is,

S.No.	Expression	Terms									
		1st	2nd	3rd	4th	5th	...	10th	...	100th	...
(i)	$2n - 1$	1	3	5	7	9	---	19	---	199	---
(ii)	$3n + 2$	2	5	8	11	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	---