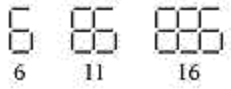
Board – CBSE	Class – 7th	Topic – Algebraic Expressions 12.4

Q.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.

(a) 

6 11 16 21... $(5n + 1)$ ...

(b) 

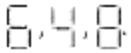
4 7 10 13... $(3n + 1)$ ...

(c) 

7 12 17 22... $(5n + 2)$ ...

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 –



Sol: (a) It is given that the number of segments required to form n digits of the kind 6 is (5n + 1).

Number of segments required to form 5 digits = $(5 \times 5 + 1) = 25 + 1 = 26$

Number of segments required to form 10 digits = $(5 \times 10 + 1) = 50 + 1 = 51$

Number of segments required to form 100 digits = $(5 \times 100 + 1) = 500 + 1 = 501$

(b) It is given that the number of segments required to form n digits of the kind 4 is (3n + 1).

Number of segments required to form 5 digits = $(3 \times 5 + 1) = 15 + 1 = 16$

Number of segments required to form 10 digits = $(3 \times 10 + 1) = 30 + 1 = 31$

Number of segments required to form 100 digits = $(3 \times 100 + 1) = 300 + 1 = 301$

(c) It is given that the number of segments required to form n digits of the kind 8 is (5n + 2).

Number of segments required to form 5 digits = $(5 \times 5 + 2) = 25 + 2 = 27$

Number of segments required to form 10 digits $= (5 \times 10 + 2) = 50 + 2 = 52$

Number of segments required to form 100 digits $= (5 \times 100 + 2) = 500 + 2 = 502$

Q.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	-	-	-	-	10, 001	-

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	-	702	-
(v)	$n^2 + 1$	2	5	10	17	26	-	101	-	10, 001	-

Sol: