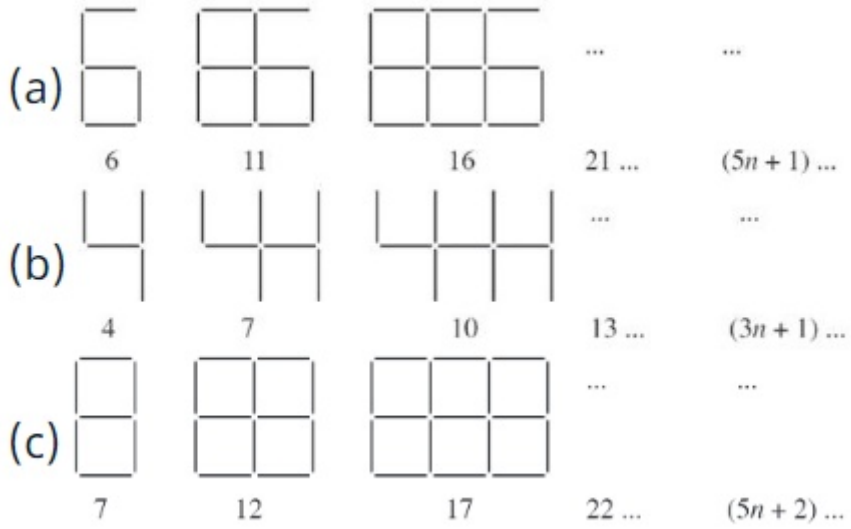
Chapter – 12
Algebraic Expression
Exercise 12.4

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.



(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 

Answer:

a) For digit

Expression : 5n + 1

Where n = no of digits

For 5 digits

No of segments required = 5(5) + 1 = 25 + 1 = 26

For 10 digits

No of segments required = 5(10) + 1 = 50 + 1 = 51

For 100 digits

No of segments required = 5(100) + 1 = 500 + 1 = 501

(b) For digit

Expression : 3n + 1

Where n = no of digits

For 5 digits

No of segments required = 3(5) + 1 = 15 + 1 = 16

For 10 digits

No of segments required = 3(10) + 1 = 30 + 1 = 31

For 100 digits

No of segments required = 3(100) + 1 = 300 + 1 = 301

(c) For digit

Expression : 5n + 2

Where n = no of digits

For 5 digits

No of segments required = 5(5) + 2 = 25 + 2 = 27

For 10 digits

No of segments required = 5(10) + 2 = 50 + 2 = 52

For 100 digits

No of segments required = 5(100) + 2 = 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	

Answer:

(i) Expression = 2n – 1

100th term (i.e. n = 100)

= 2(100) – 1

= 200 – 1

= 199

(ii) Expression = 3n + 2

5th term (i.e. n = 5)

= 3(5) + 2

= 15 + 2

= 17

10th terms (i.e. n =10)

=3(10) + 2

=30 + 2

= 32

100th term (i.e. n = 100)

=3(100) + 2

= 300 + 2

= 302

(iii)Expression = 4n + 1

5th term (i.e. n = 5)

= 4(5) + 1

= 20 + 1

= 21

10th terms (i.e. n =10)

= 4(10) + 1

= 40 + 1

= 41

100th term (i.e. n = 100)

= 4(100) + 1

= 400 + 1

= 401

(iv) Expression = 7n + 20

5th term (i.e. n = 5)

= 7(5) + 20

= 35 + 20

= 55

10th terms (i.e. n =10)

=7(10) + 20

=70 + 20

= 90

100th term (i.e. n = 100)

=7(100) + 20

= 700 + 20

= 720

(v) Expression = $n^2 + 1$

5th term (i.e. n = 5)

= $(5)^2 + 1$

= 25 + 1

= 26

10th terms (i.e. n =10)

= $(10)^2 + 1$

=100 + 1

= 101

So the 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	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	