


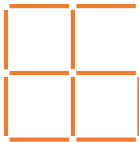
Exercise 12.4

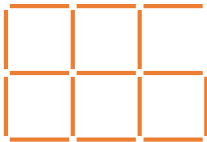
Question 1:

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.

(a)







...

...

6


11

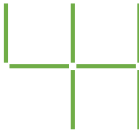
16

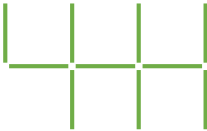
21...

(5n + 1)...

(b)







...

...

4


7

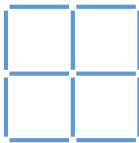
10


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 1:

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

(Chapter – 12) (Algebraic Expressions)

(Class – VII)

(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									
		1 st	2 nd	3 rd	4 th	5 th	...	10 th	...	100 th	...
(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 2:

(i) $2n - 1$

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

(ii) $3n + 2$

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

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(iii)	Putting	$n = 10,$	$3 \times 10 + 2 = 30 + 2 = 32$
	Putting	$n = 100,$	$3 \times 100 + 2 = 300 + 2 = 302$
	$4n + 1$		
(iv)	Putting	$n = 5,$	$4 \times 5 + 1 = 20 + 1 = 21$
	Putting	$n = 10,$	$4 \times 10 + 1 = 40 + 1 = 41$
	Putting	$n = 100,$	$4 \times 100 + 1 = 400 + 1 = 401$
(v)	$7n + 20$		
	Putting	$n = 5,$	$7 \times 5 + 20 = 25 + 20 = 55$
	Putting	$n = 10,$	$7 \times 10 + 20 = 70 + 20 = 90$
(v)	Putting	$n = 100,$	$7 \times 100 + 20 = 700 + 20 = 720$
	$n^2 + 1$		
	Putting	$n = 5,$	$5 \times 5 + 1 = 25 + 1 = 26$
(v)	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									
		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)	$3n + 2$	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	---