

Exercise 5(F)

1. For each pattern, given below, write the next three steps:

i)  $1 \times 9 + 1 = 10$

$12 \times 9 + 2 = 110$

$123 \times 9 + 3 = 1110$

Ans-  $1234 \times 9 + 4 = 11110$

$12345 \times 9 + 5 = 111110$

$123456 \times 9 + 6 = 1111110$

ii)  $9 \times 9 + 7 = 88$

$98 \times 9 + 6 = 888$

$987 \times 9 + 5 = 8888$

Ans-  $9876 \times 9 + 4 = 88888$

$98765 \times 9 + 3 = 888888$

$987654 \times 9 + 2 = 8888888$

iii)  $1 \times 8 + 1 = 9$

$12 \times 8 + 2 = 98$

$123 \times 8 + 3 = 987$

Ans-  $1234 \times 8 + 4 = 9876$

$12345 \times 8 + 5 = 98765$

$123456 \times 8 + 6 = 987654$

iv)  $111 \div 3 = 37$

$222 \div 6 = 37$

$333 \div 9 = 37$

Ans-  $444 \div 12 = 37$

$555 \div 15 = 37$

$666 \div 18 = 37$

2. Complete each of the following magic squares:

i)

Ans- → Sum for the row-wise is as follows

$$= 6 + 7 + 2 = 15$$

$$= 1 + 5 + 9 = 15$$

$$= 8 + 3 + 4 = 15$$

6	7	2
1	5	9
8	3	4

→ Sum for the column wise is as follows

$$= 6 + 1 + 8 = 15$$

$$= 7 + 5 + 3 = 15$$

$$= 2 + 9 + 4 = 15$$

→ Sum for diagonal wise is as follows

$$= 6 + 5 + 4 = 15$$

$$= 2 + 5 + 8 = 15$$

Hence, the magic square is

ii)

Ans- → Row wise sum is as follows:

$$= 4 + 9 + 8 = 21$$

$$= 11 + 7 + 3 = 21$$

$$= 6 + 5 + 10 = 21$$

4	9	8
11	7	3
6	5	10

→ Column wise sum is as follows:

$$= 4 + 11 + 6 = 21$$

$$= 9 + 7 + 5 = 21$$

$$= 8 + 3 + 10 = 21$$

→ Diagonal wise sum is as follows

$$= 4 + 7 + 10 = 21$$

$$= 8 + 7 + 6 = 21$$

Hence, the magic square is

iii)

Ans-  $\rightarrow$  Row wise sum is as follows:

$$= 16 + 2 + 12 = 30$$

$$= 6 + 10 + 14 = 30$$

$$= 8 + 18 + 4 = 30$$

$\rightarrow$  Column wise sum is as follows

$$= 16 + 6 + 8 = 30$$

$$= 2 + 10 + 18 = 30$$

$$= 12 + 14 + 4 = 30$$

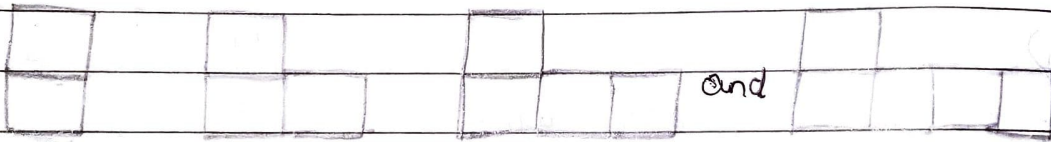
$\rightarrow$  Diagonal wise sum is as follows

$$= 16 + 10 + 4 = 30$$

$$= 12 + 10 + 8 = 30$$

16	2	12
6	10	14
8	18	4

3. See the following patterns carefully:



i) If  $n$  denotes the number of figures and  $S$  denotes the number of matchsticks; find  $S$  in terms of  $n$ .

$n$	1	2	3	4	The table is
$S$	7	10	13	16	$S = 3n + 4$

i) Find how many matches are required to make the:

1) 15<sup>th</sup> figure

Ans- ~~The table is~~  $S = 3n + 4$   $S = 3n + 4$

$$3 \times 15 + 4$$

$$= 49 \text{ matches}$$

2) 40<sup>th</sup> figure

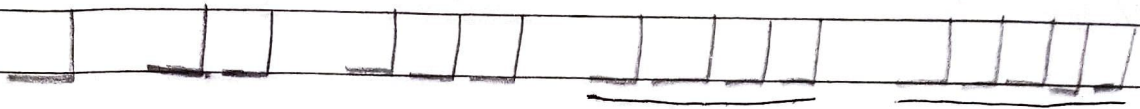
Ans-  $3 \times 40 + 4$

$$= 124 \text{ matches}$$

iii) Write a description of the pattern in words.

Ans - It is clear that each time the figure ( $n$ ) is increased by 4, the number of matches ( $S$ ) are increased by 3.

4.ii) In the following pattern, draw the next two figures.



ii) Construct a table to describe the figures in the above pattern.

Ans -

$N$	1	2	3	4	5
$L$	2	4	6	8	10

iii) If  $n$  denotes the number of figures and  $L$  denotes the number of matchsticks, find the  $L$  in the terms of  $n$ .

Ans - The value of  $L$  is  $L = 2n$

iv) Find how many matchsticks are required to make the :

1) 12<sup>th</sup> figure

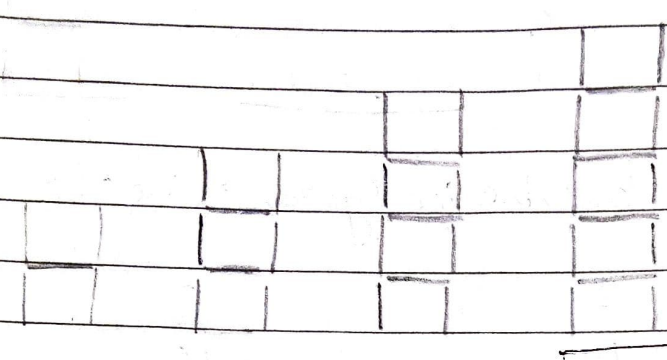
Ans - Number of matchsticks in 12<sup>th</sup> figure =  $2 \times 12 = 24$

2) 20<sup>th</sup> figure

Ans - Number of matchsticks in 20<sup>th</sup> figure =  $2 \times 20 = 40$

5. i) In each case, if  $n$  denotes the number of figures and  $F$  denotes the number of matchsticks used, find  $F$  in terms of  $n$ .
- ii) Also, find, in each case, how many matchsticks are required to make the  $16^{\text{th}}$  figure and  $30^{\text{th}}$  figure.

a)



- i) If  $n$  denotes the number of figures and  $F$  denotes the number of matchsticks used, find  $F$  in terms of  $n$ .

$n$	1	2	3	4
$F$	5	8	11	14

The table is  $3n + 2$

So,  $F = 3n + 2$

- ii) How many matchsticks are required to make the:

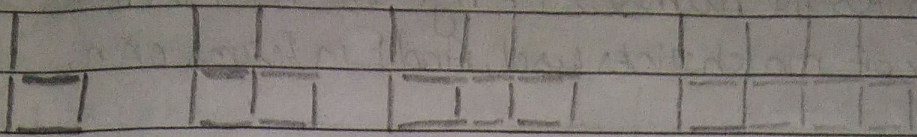
1)  $16^{\text{th}}$  figure

Ans -  $F = 3n + 2$   
 $F = 3 \times 16 + 2$   
 $= 48 + 2$   
 $= 50$

2)  $30^{\text{th}}$  figure

Ans -  $F = 3n + 2$   
 $F = 3 \times 30 + 2$   
 $= 90 + 2$   
 $= 92$

b)



i) If  $n$  denotes the number of figures and  $F$  denotes the number of matchsticks used, find  $F$  in terms of  $n$ .

$N$	1	2	3	4
$F$	5	9	13	17

The table is  $4n + 1$

So,  $F = 4n + 1$

ii) How many matchsticks are required to make the:

1) 16<sup>th</sup> figure

Ans -  $F = 4n + 1$

$F = 4 \times 16 + 1$

$= 64 + 1$

$= 65$

2) 30<sup>th</sup> figure

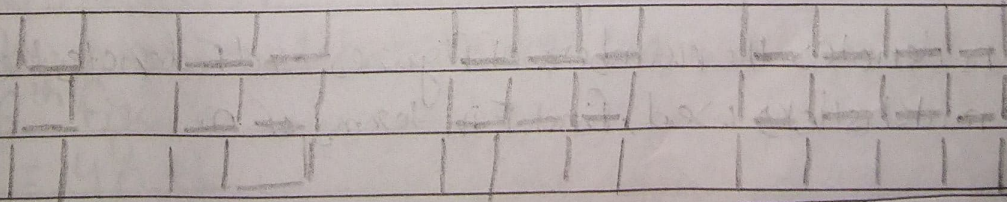
Ans -  $F = 4n + 1$

$F = 4 \times 30 + 1$

$= 120 + 1$

$= 121$

c)



i) If  $n$  denotes the number of figures and  $F$  denotes the number of matchsticks used, find  $F$  in terms of  $n$ .

N	1	2	3	4
F	8	13	18	23

The table is  $5n + 3$

So,  $F = 5n + 3$

ii) ~~In each case~~ How many matchsticks are required to make the:

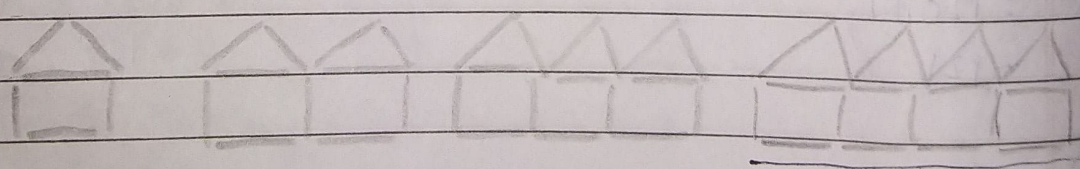
1) 16<sup>th</sup> figure

Ans-  $F = 5n + 3$   
 $F = 5 \times 16 + 3$   
 $= 80 + 3$   
 $= 83$

2) 30<sup>th</sup> figure

Ans-  $F = 5n + 3$   
 $F = 5 \times 30 + 3$   
 $= 150 + 3$   
 $= 153$

d)



i) If  $n$  denotes the number of figures and  $F$  denotes the number of matchsticks used, find  $F$  in terms of  $n$ .

N	1	2	3	4
F	6	11	16	21

The table is  $5n + 1$

So,  $F = 5n + 1$

ii) How many matchsticks are required to make the :

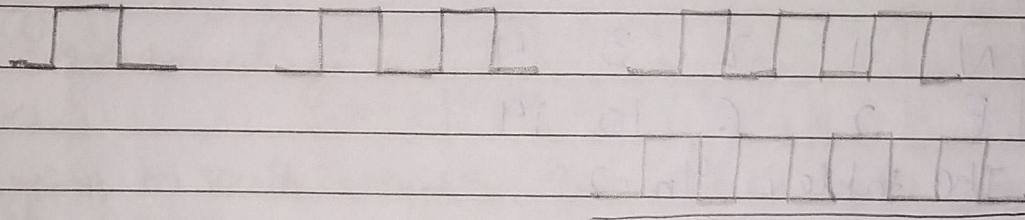
1) 16<sup>th</sup> figure

Ans-  $F = 5n + 1$   
 $F = 5 \times 16 + 1$   
 $= 80 + 1$   
 $= 81$

2) 30<sup>th</sup> figure

Ans-  $F = 5n + 1$   
 $F = 5 \times 30 + 1$   
 $= 150 + 1$   
 $= 151$

c)



i) If  $n$  denotes the number of figures and  $F$  denotes the number of matchsticks used, find  $F$  in terms of  $n$ .

$N$	1	2	3	4
$F$	5	9	13	17

The table is  $4n + 1$

So,  $F = 4n + 1$

ii) How many matchsticks are required to make the :

1) 16<sup>th</sup> figure

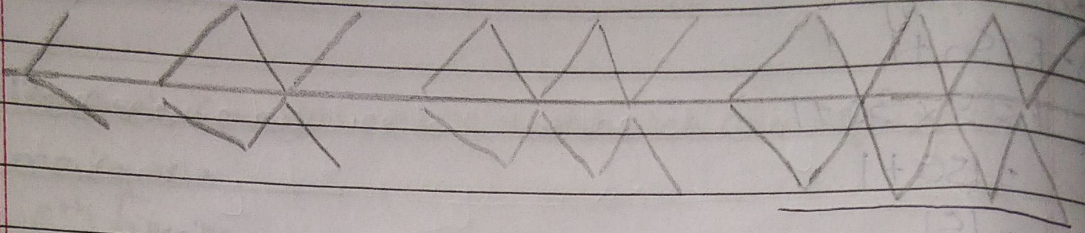
Ans-  $F = 4n + 1$   
 $F = 4 \times 16 + 1$   
 $= 64 + 1$   
 $= 65$



2) 30<sup>th</sup> Figure

Ans-  $F = 4n + 1$   
 $F = 4 \times 30 + 1$   
 $= 120 + 1$   
 $= 121$

f)



i) If  $n$  denotes the number of figures and  $F$  denotes the number of matchsticks used, find  $F$  in terms of  $n$ .

N	1	2	3	4
F	2	6	10	14

The table is  $4n - 2$

So,  $F = 4n - 2$

ii) How many matchsticks are required to make the :

1) 16<sup>th</sup> figure

Ans-  $F = 4n - 2$   
 $F = 4 \times 16 - 2$   
 $= 64 - 2$   
 $= 62$

2) 30<sup>th</sup> Figure

Ans-  $F = 4n - 2$   
 $F = 4 \times 30 - 2$   
 $= 120 - 2$   
 $= 118$