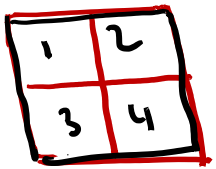
IFAS CSIR NET

OBSERVATIONAL SKILLS II

Number of squares in the box:

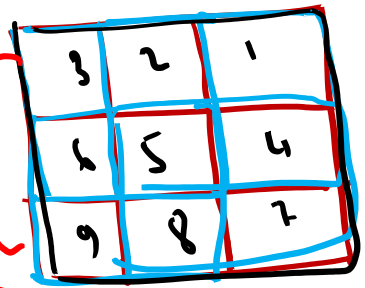


No. of squares $= 1^2 + 2^2$

2X2

How many squares are there?

4 (1x1 squares) + 1 (2x2 square) = 5

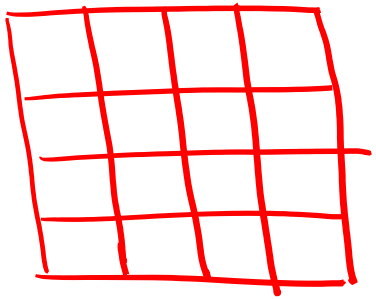


No. of squares $= 1^2 + 2^2 + 3^2 = 14$

3x3

How many squares are there?

9 (1x1 squares) + 4 (2x2 squares) + 1 (3x3 square) = 14



4x4 Box

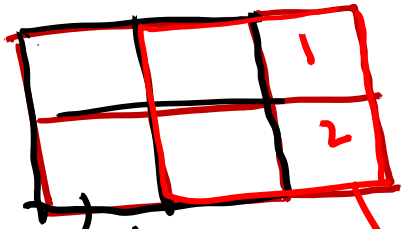
How many squares are there?

$1^2 + 2^2 + 3^2 + 4^2$

$= 14 + 16$

$= 30$ (Ans.)

- How many squares are there?



Total = 5 + 3 = 8

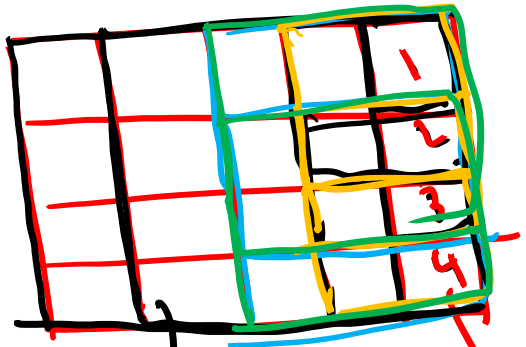
Base Box = 2×2

$1^2 + 2^2 = 5$

1 new column

new squares = 2 (1×1 squares) + 1 (2×2 square)

= 3



How many squares are there?

$1^2 + 2^2 + 3^2 + 4^2$

$= 30$

1 column added

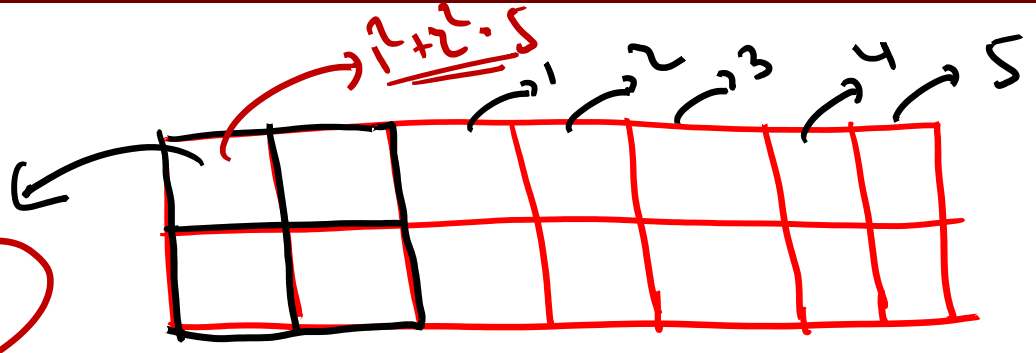
new squares

$= 4 + 3 + 2 + 1$

(1x1 squares) (1x2 squares) (3x3 squares) (4x4 squares)

$\frac{4(4+1)}{2}$

Ex:



Base Box 2×2

m = 2

1 column/row added → new squares $\frac{m(m+1)}{2}$

1- How many squares are there?

m = 2

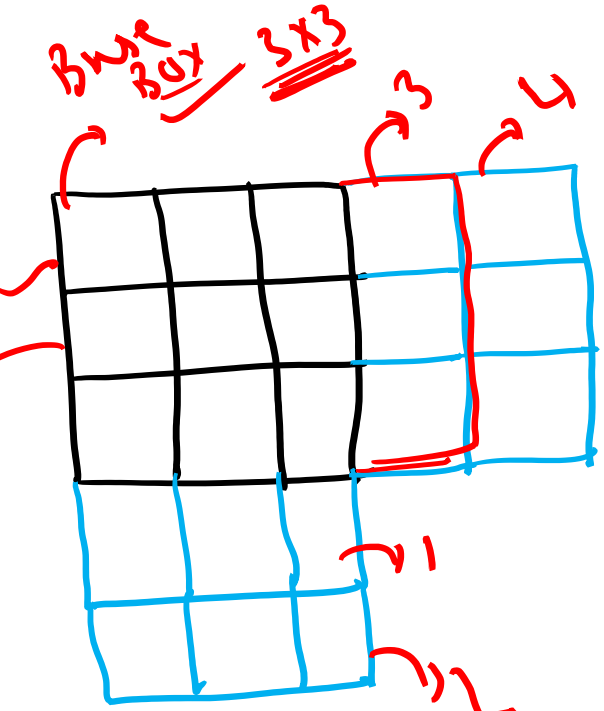
1 Column add → squares $\frac{2\times(2+1)}{2} = 3$

5 Column add → $3\times5 = 15$

Total = 5 + 15 = 20 (Ans)

Q.

How many squares are there?



3x3 Box

$1^2+2^2+3^2$

$= 14$

Total $= 14+24 = 38$

$4 \times 6 = 24$

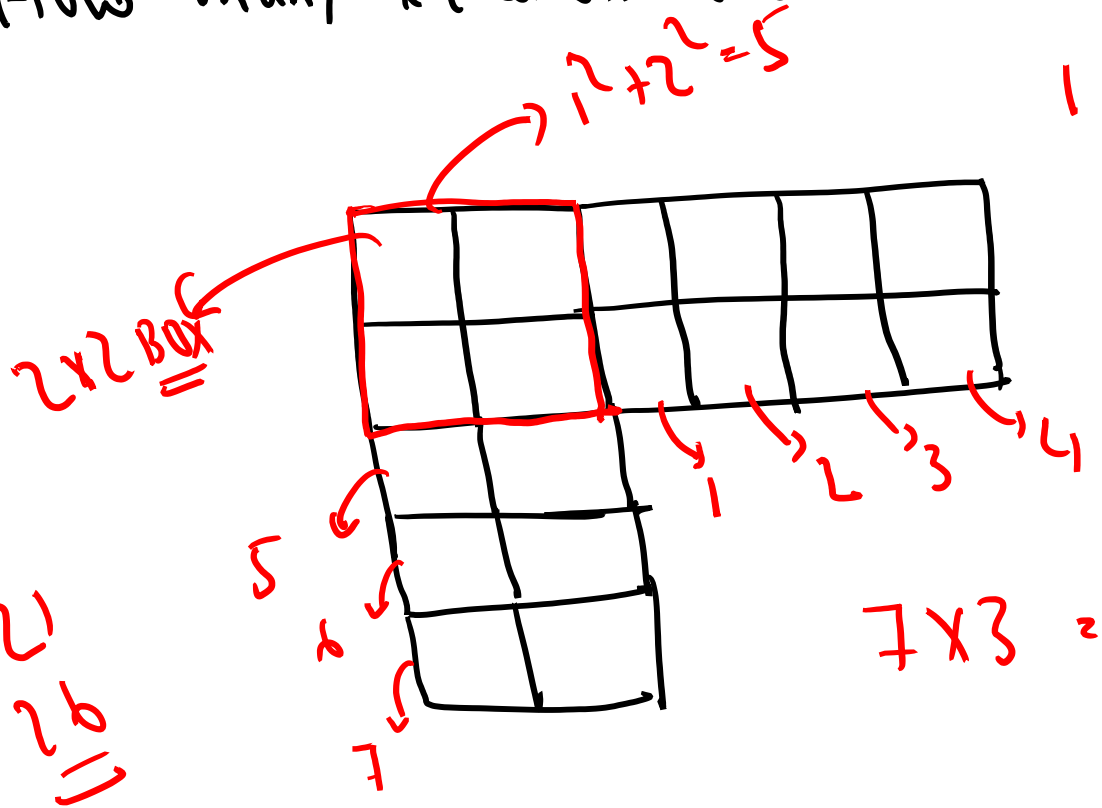
$m = 3$

1 row/column → new squares

$\frac{m(m+1)}{2}$

$\frac{3(3+1)}{2} = 6$

Q. How many squares are there ?



m.2

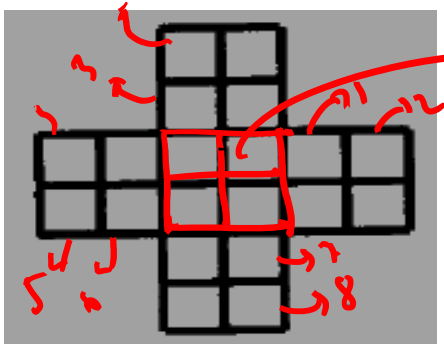
1 column/row → $\frac{m(m+1)}{2}$

$\frac{2\times3}{2} = 3$

Total = 5+2+2 = 9

$7\times3 = 21$

The number of squares in the figure is: (CSIR)



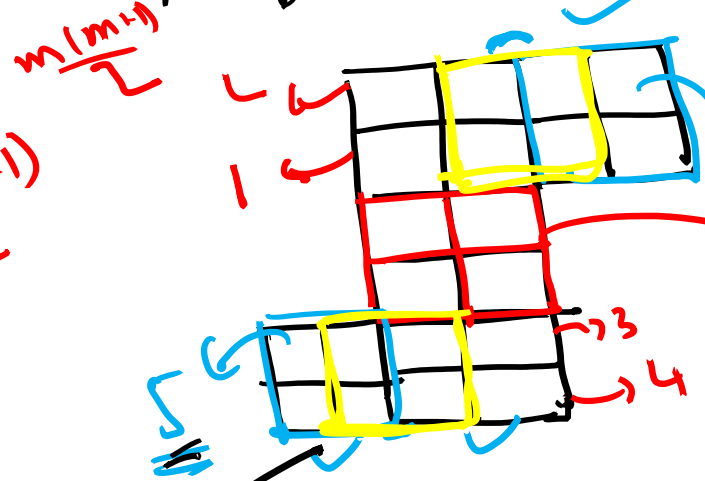
(1) 30

(2) 29

(3) 25

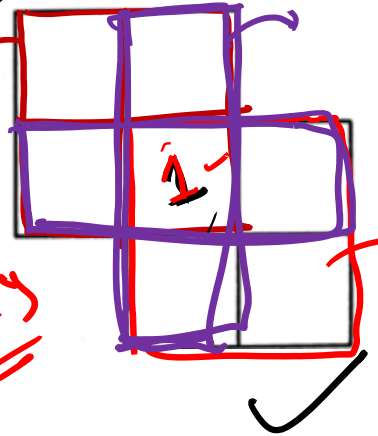
(4)20

Q. How many squares are there?



(1) 30 (2) 24 (3) 25 (4) 20

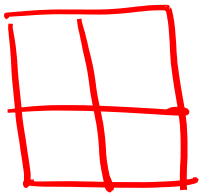
How many quadrilaterals does the following figure have?



(1) 17
(2) 18
(3) 19
(4) 20

No. of quadrilaterals in 2 x 2 Box

$1^3 + 2^3 = 9$

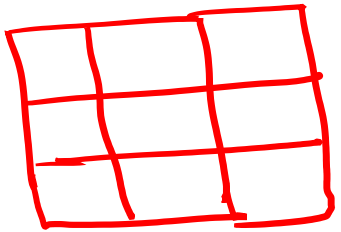


No. of quadrilaterals/rectangles in 3 x 3 Box

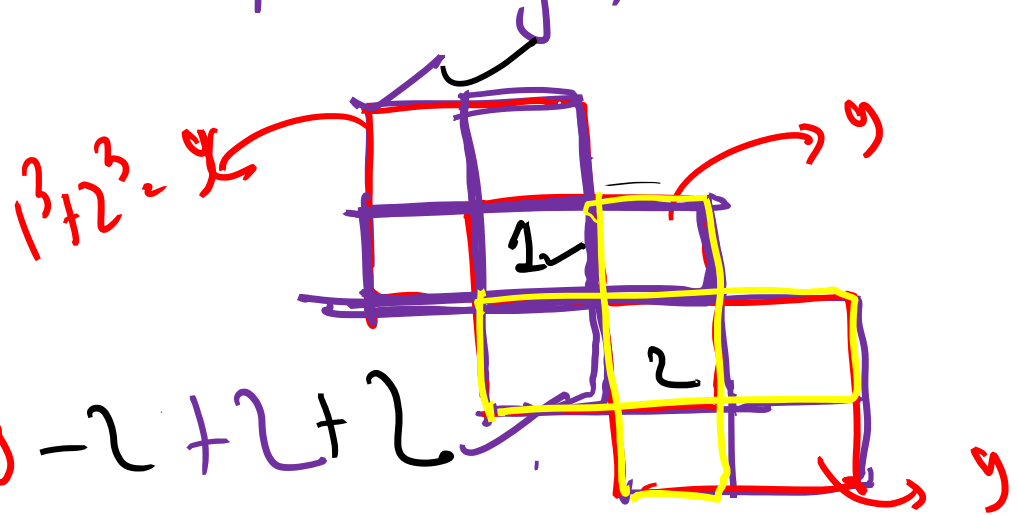
$1^3 + 2^3 + 3^3$

$= 1 + 8 + 27$

$= 36$



Q. How many rectangles are there?

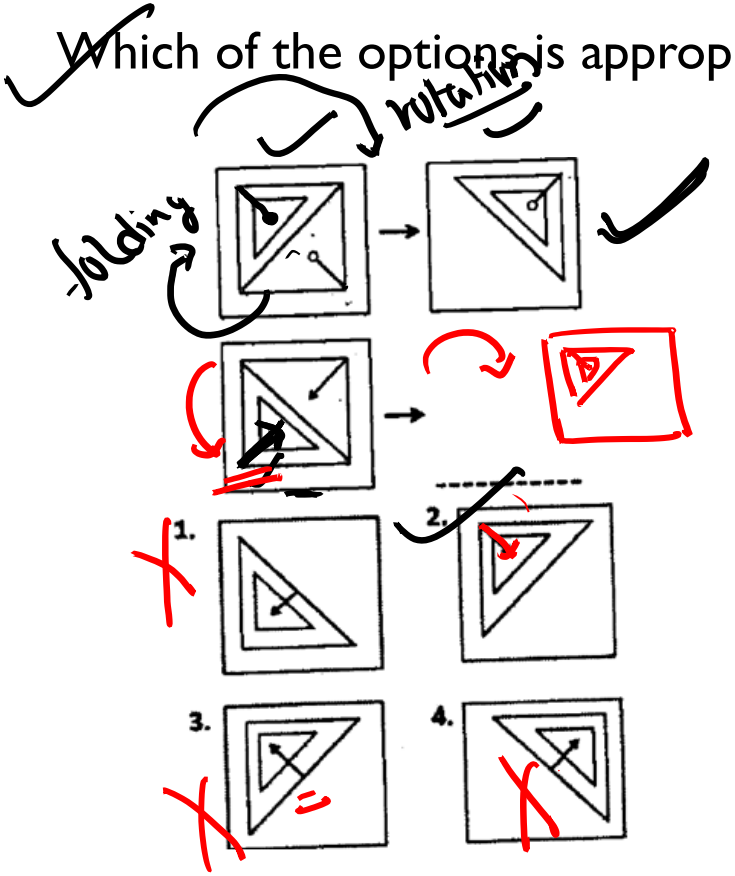


$9+9+9-2+2+2$

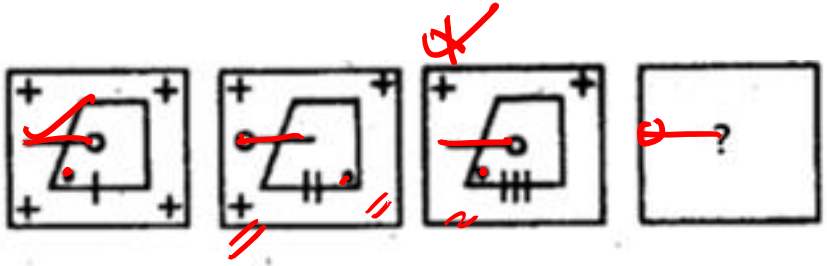
$= 29$

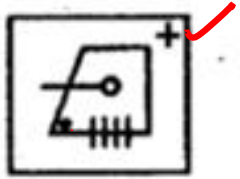
Which of the options is appropriate for the blank space?

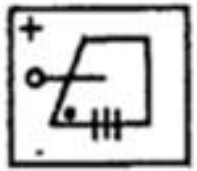
(CSIR)

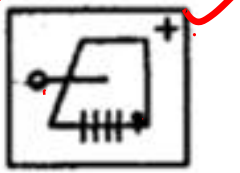


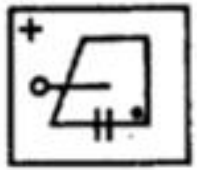
Find the missing figure in the following sequence? **(CSIR)**



1. 

2. 

3. 

4. 

If 'SELDOON' means 'NOODLES' then what does 'SPUOS' mean?

(CSIR)

(1) SALAD

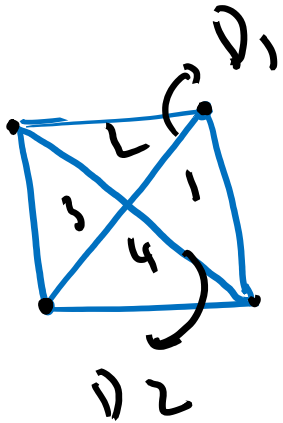
(2) SOUPS

(3) RASAM

(4) ONION

Finding number of triangles

(Type-I) Finding triangles in squares/rectangles/quadrilaterals:



How many triangles are there?

Blocks = 4

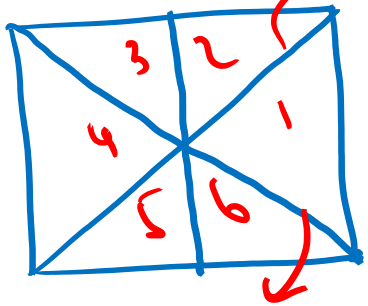
Diagonals = 2

(Block x Diagonals)

Total triangles

= 4 x 2

= 8



D1

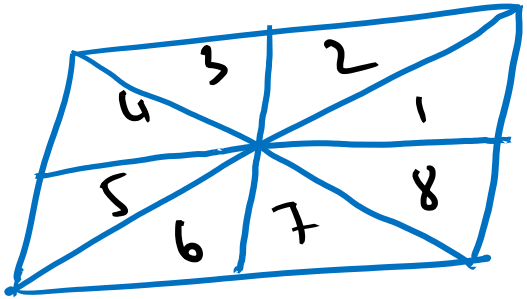
D2

How many triangles are there?

Blocks = 6

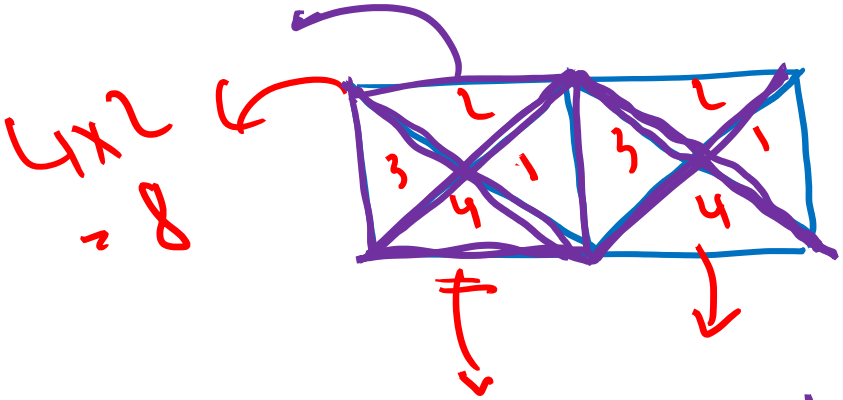
Diagonals = 2

Triangles = 2 x 6 = 12



How many triangles are there?

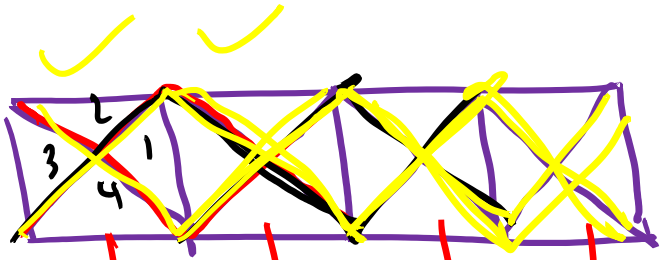
Triangles = 8 x 2 = 16



How many triangles are there?

Triangles $= 8 + 8 + 2$

$= 18$



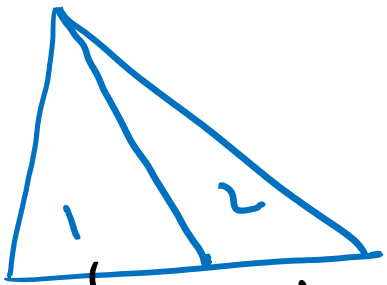
How many triangles are there?

8 + 8 + 8 + 8 + 2 + 2 + 2

= 38

(Type II) (A) Finding number of triangles in a triangle having separators from a vertex to opposite side.

How many triangles are there?

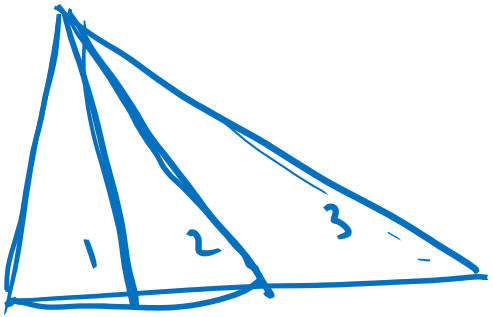


$2 + 1 = 3$

$\frac{2(2+1)}{2} = 3$

no. of sections $= m$

$\frac{m(m+1)}{2}$ → Total triangles

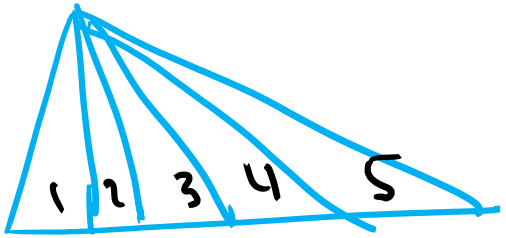


1-how many triangles are there?

3 + 2 + 1

$$\frac{3(3+1)}{2} = 6$$

How many triangles are there?

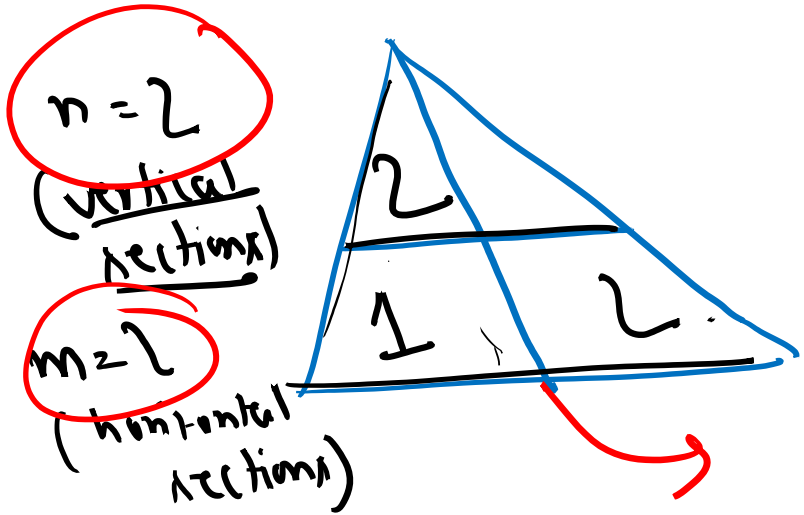


$$\frac{n(n+1)}{2}$$

$$= \frac{5 \times 6}{2}$$

$$= 15$$

(B) Finding number of triangles in a triangle having seperators from the vertex to opp. side and from side to side.

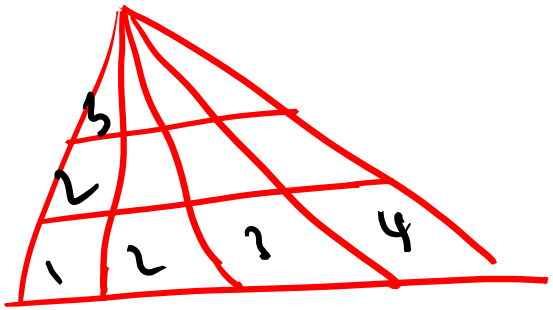


How many triangles are there ?

$$\text{Triangles} = \frac{n \times m \times (m+1)}{2}$$

$$\frac{2 \times 2 \times 3}{2} = 6$$

How many triangles are there?



$$\frac{n \times m \times (m+1)}{2}$$

n = vertical sections

m = horizontal sections

$n = 4$

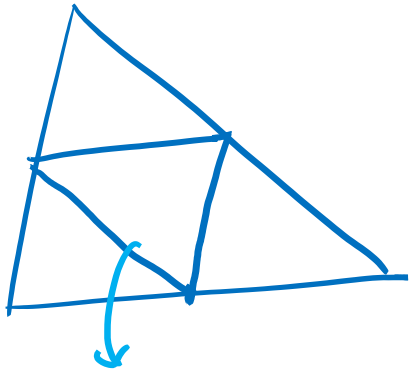
$m = 3$

$$\text{Triangles} = \frac{4 \times 3 \times 5}{2}$$

$$= 30.$$

Type III: Finding triangles in a triangle with embedded triangle:

How many triangles are there?



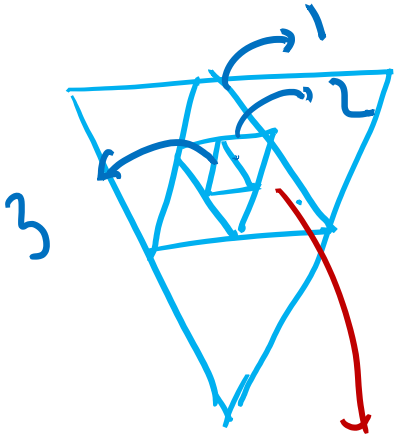
n = 1 (no. of embedded triangles)

Triangles = 4n + 1

n = 1, (4 × 1) + 1

= 5

(Ans)



n = 3

How many triangles are there?

Triangles - $4n + 1$

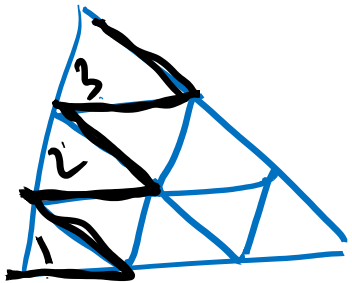
$= (4 \times 3) + 1$

$= 13$.

Type – IV

Finding number of triangles in a triangle filled with "shark teeth" triangles.

3 shark teeth



$n = 3$

$$\text{Triangles} = \frac{n(n+2)(2n+1)}{8}$$

$$= \frac{3 \times 5 \times 7}{8} = \frac{105}{8} \approx 13$$

(Ans)

8

105

8

25

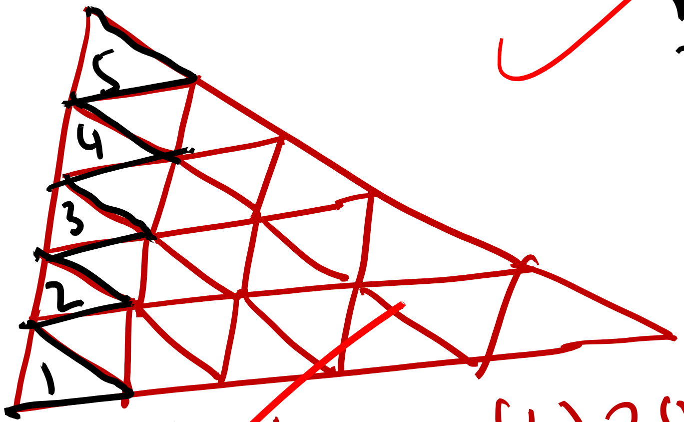
24

1 0

(CSIR 2020 NOV)

How many triangles are there?

$n = 5$



$$\frac{n(n+2)(2n+1)}{8}$$

$$\frac{5 \times 7 \times 11}{8} = \frac{385}{8} = 48$$

$35 \times 11 = 385$

$65 \times 11 = 715$

(1) 46 (2) 56 (3) 48 (4) 38

HAPPY LEARNING

THANKS