

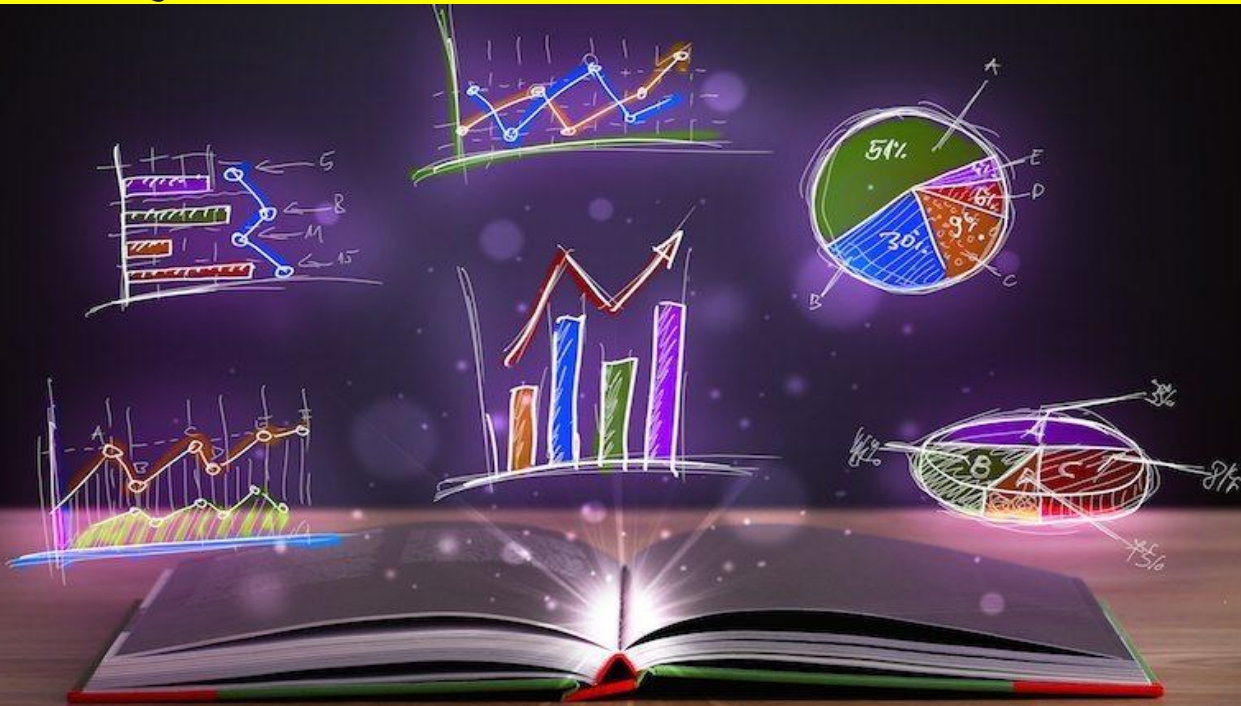
MATHLETE



(अक्सर पूछा करते हैं.....)

Classes – 6th to 8th

Series
7



MATHEMATICAL LITERACY GROUP- CHANDIGARH

Pattern

Introduction

We see 'Patterns' all around us all the time.

There is a pattern in day and night. There is a pattern in seasons. There is a pattern in the petals of the flower and there is a pattern in the ripples of the water pond.

What is a Pattern?

A pattern is a series or sequence that repeats. Math Patterns are sequences that repeat based on a rule, and a rule is a set way to calculate or solve a problem.

We will work on some examples step by step to find out a way to get to these rules.



In **Mathematics**, a **pattern** is a repeated arrangement of numbers, shapes, colours and so on.



TYPES OF PATTERNS

1. LETTER PATTERNS

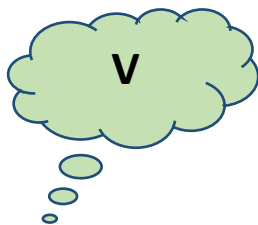
Which letter replaces the question mark?



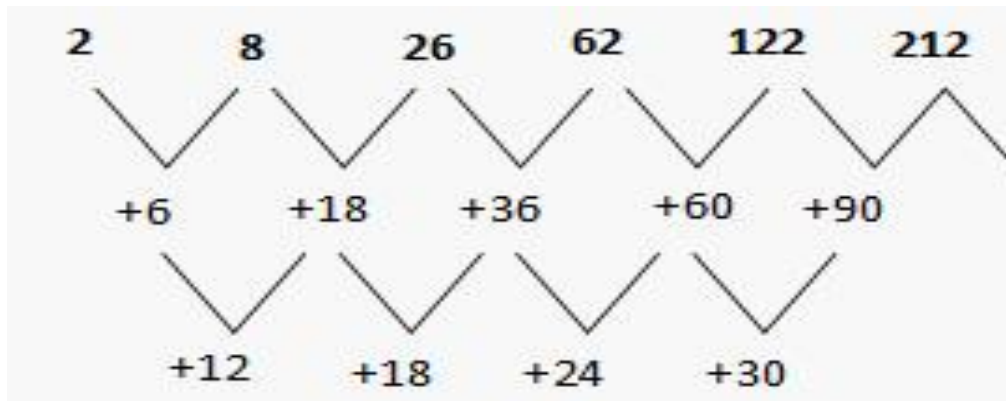
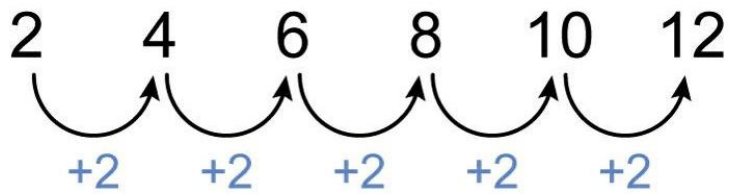
G, because the numerical values of the letters in each row add up to 26 each time.



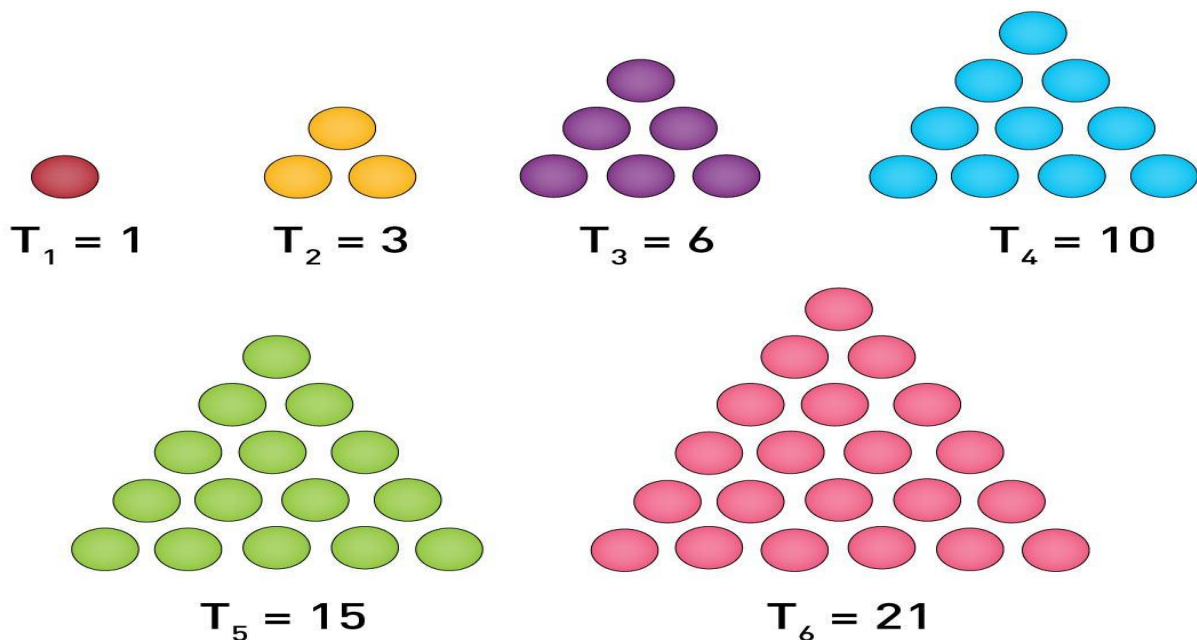
❖ What is the missing letter in the series?



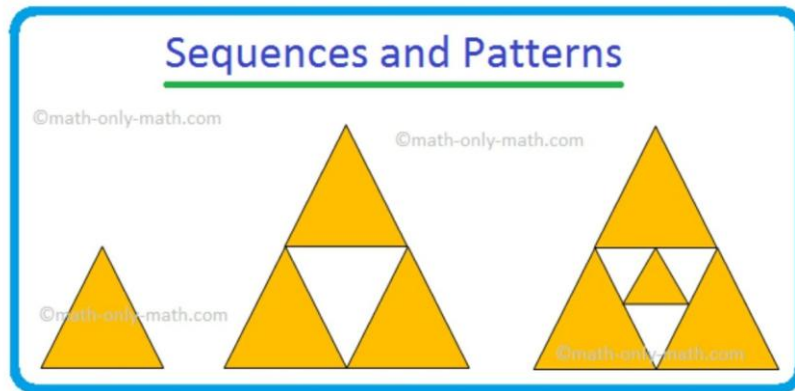
2. NUMBER PATTERNS



3. GEOMETRIC PATTERNS



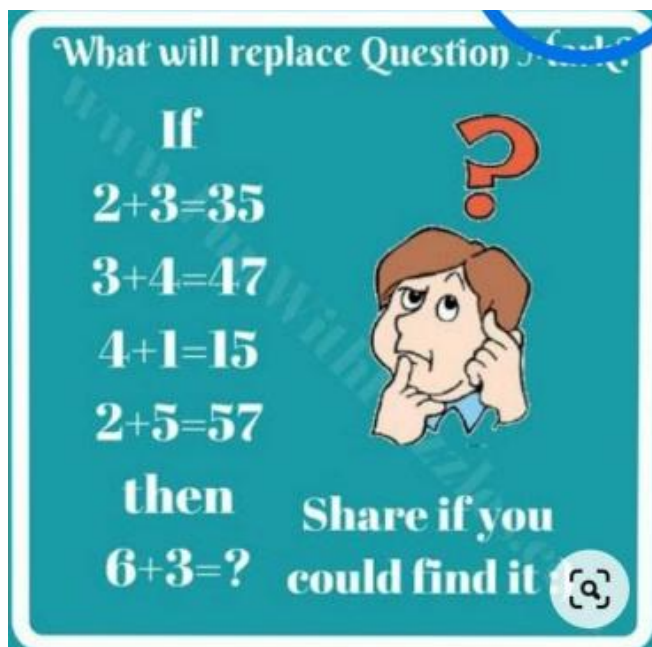
TASK 1



➤ Can you guess the number of triangles in the fourth shape?

BRAIN TEASER

- ❖ How can you make the number seven EVEN??
- ❖ What five-letter word gets shorter when you add two letters to it?
- ❖ How many times will you fold a 2inch X 4inch rectangle to get a triangle?



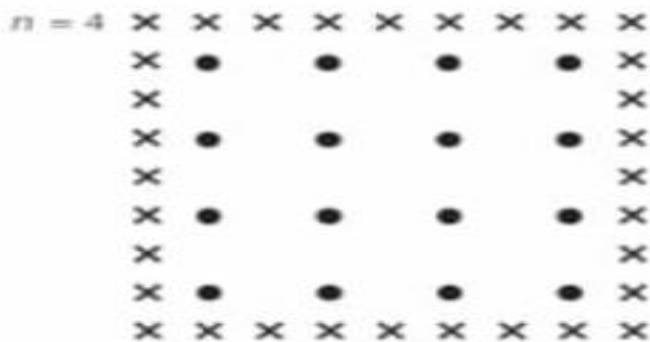
NOTE

Patterns help in enhancing critical thinking skills and can be used effectively in everyday life.

TASK 2

A farmer plants apple trees in a square pattern. In order to protect the apple trees against the wind, he plants conifer trees all around the orchard.

Here you see a diagram of the situation, where you can see the pattern of apple trees and conifer trees for any number (n) of rows of apple trees.



1. Complete the table:

n	Number of Apple Trees	Number of Conifer Trees
1	1	8
2	4	
3		
4		
5		

2. There are two formulae you can use to calculate the number of apple trees and the number of conifer trees for the pattern described on the previous page.

Number of apple trees = n^2

Number of conifer trees = $8n$

Where n is the number of rows of apple trees.

There is a value of n for which the number of apple trees equals to number of conifer trees. Find the value of n and show your method of calculating this.

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3. Suppose the farmer wants to make a much larger orchard with many rows of trees. As the farmer makes the orchard bigger, which will increase more quickly: the number of apple trees or the number of conifer trees? Explain how you found your answer.

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FUN TIME

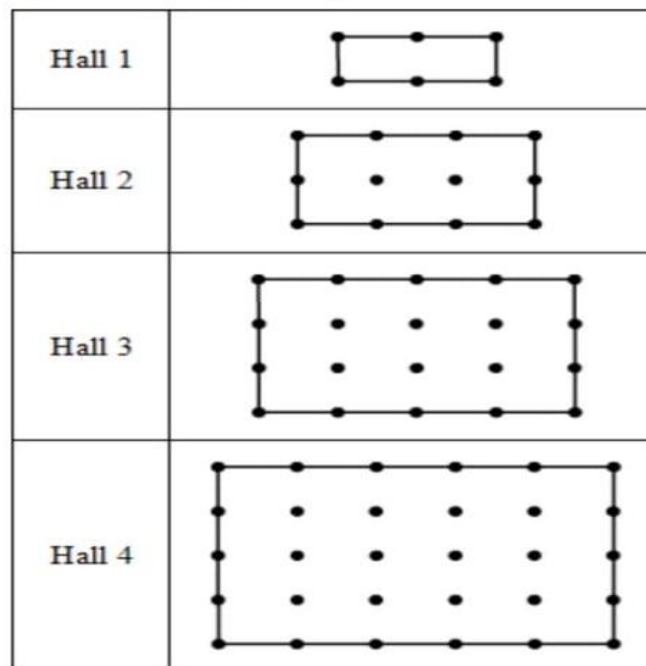
Do you see a card among the gift bags?



Task 3

Here is a bird's eye view of the possible sizes of a banquet hall from Ancient Rome.

The hall is made of pillars and wall sections. The pillars are represented as dots and the wall sections are represented using line segments.



1. Complete the following table:

Hall Number	Number of pillars(dots)	Number of wall sections (lines)
1	6	6
2	12	10
3		
4		
5		

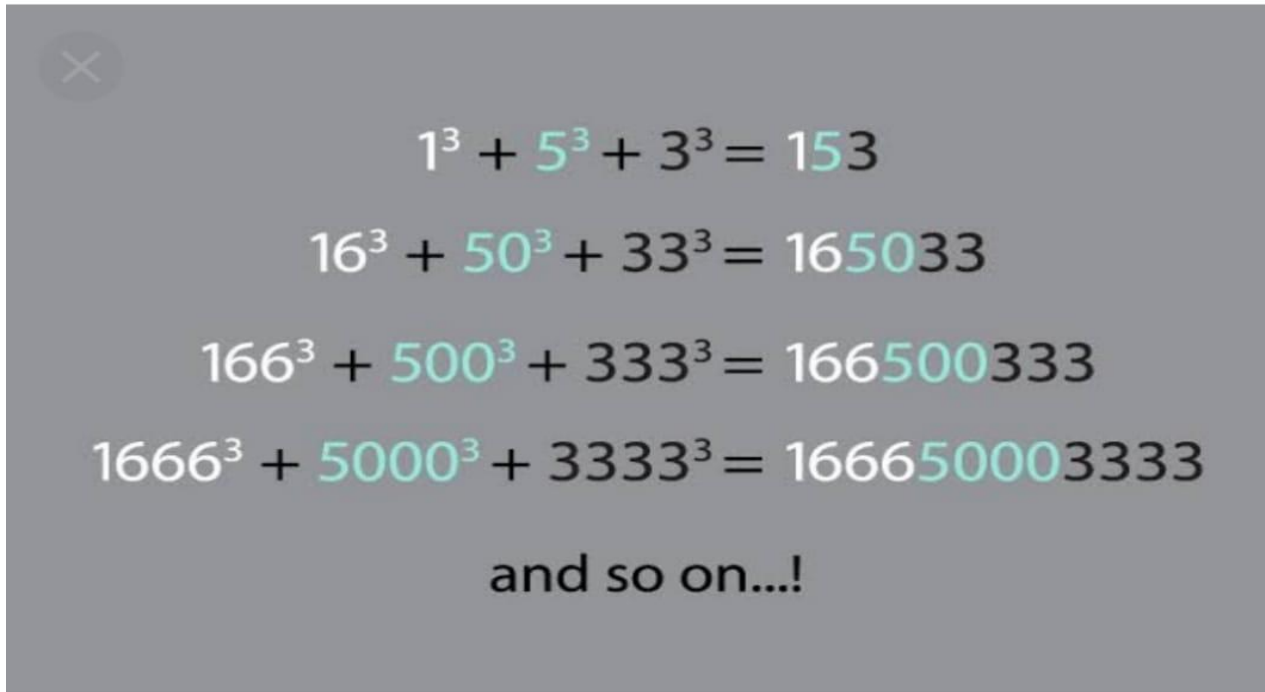
2. Two of the courtiers Zieus and Julius deduced a formula to calculate the number of pillars for the banquet hall mentioned above where 'n' is the Hall number

(a) Zieus's formula is $n(n+1)$

(b) Julius's formula is $(n+1)(n+2)$

Who deduced the correct formula?

AMAZING FACT


$$\begin{aligned}1^3 + 5^3 + 3^3 &= 153 \\16^3 + 50^3 + 33^3 &= 165033 \\166^3 + 500^3 + 333^3 &= 166500333 \\1666^3 + 5000^3 + 3333^3 &= 166650003333 \\&\text{and so on...!}\end{aligned}$$

AMAZING PATTERN

Green Number Patterns. Triangular Numbers are numbers that may be expressed as an array of dots in the shape of an equilateral triangle with each side having n dots for any positive integer, n . The first four triangular numbers are 1, 3, 6, and 10. (Hint: label the first triangle $n=1$, the second $n=2$, and so on.)



Answer Key

TASK 1

- 13 Triangles

BRAIN TEASER

- Drop 's' from seven to make it even
- word "short"
- 2 times
- 39

TASK 2

1)

n	Number of apple trees	Number of conifer trees
1	1	8
2	4	16
3	9	24
4	16	32
5	25	40

2) $n=8$

3) apple trees

TASK 3

1.

Hall No.	Number of pillars	Number of walls
3	20	14
4	30	18
5	42	22

2. Julius's formula is correct $(n+1)(n+2)$