Online Class Supporting Materials

MALAPPURAM EDUCATIONAL DISTRICT

X Maths(EM)-1.01

ARITHMETIC SEQUENCES

Sequences and their algebra

- **Sequence : A collection of numbers which proceed according to a rule.**

Eg :- (1) 1, 2, 3, 4…… Sequence of natural numbers
(2) 1, 3, 5, 7……. Sequence of odd numbers
(3) 2, 4, 6, 8……. Sequence of even numbers
(4) 2, 3, 5, 7……. Sequence of prime numbers
(5) 1, 4, 9, 16…….. Sequence of perfect squares

Note : The numbers in a sequence are called "Terms" and the terms are represented as x_1, x_2, x_3…….

- **Algebra of a sequence : Method of expressing a sequence using a variable. Since the variable is 'n' is used it is known as nth term(x_n)**

Eg :-

Sl. No	Sequence	Algebraic Form(x_n)
1	1, 2, 3, 4…….	n
2	2, 4, 6, 8…….	2n
3	1, 3, 5, 7…….	2n-1
4	1, 4, 9, 16……..	n^2
5	5, 10, 15, 20……..	5n

Algebraic form of some sequences cannot be written

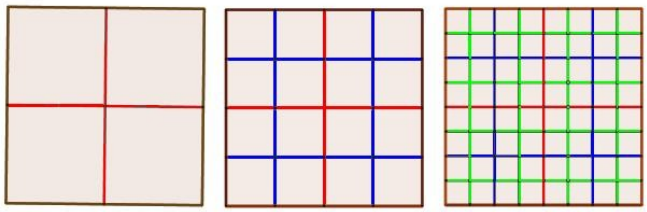
Eg :- (1) 2, 3, 5, 7……. Sequence of prime numbers
(2) 1, 7, 3, 2……. Sequence of digits in the value of √3

If n is given values 1, 2, 3…… in algebraic form we get x_1, x_2, x_3…….

WORK SHEET 1

1. Square is a quadrilateral with all its four sides equal and four angle equal
   a. Draw rough figure of squares with sides 1cm, 2cm, 3cm…… as a sequence
   b. Write the sequence of the areas of above squares
   c. Express the sequence ‘b’ in another way (Instead of areas of squares with sides 1cm, 2cm, 3cm….)
   d. Write the sequence of the lengths of the diagonals of the squares.
   e. Express the sequences b,d using algebra.

2. In the figure a square is divided in to four equal squares. Each small square obtained is divided in to four equal squares and so on. If the process is continued



……

   a. Write the number of smallest squares in each figure as a sequence.
   b. Write the algebraic form of the sequence ‘a’.
   c. Proceeding like this find the position of the figure with 1024 smallest squares.
   d. If the area of the big square is 1 write the sequence of areas of a smallest square in each figure.
   e. What is the algebra of the sequence ‘d’.

3. In the following table match the columns A, B, C appropriately.

Sequence				Algebraic form	
A		B		C	
a	Sequence of reciprocals of natural numbers.	a	5, 10, 15, 20……	a	10^n-1
b	Sequence of multiples of 5	b	3, 9, 27, 81……	b	180n
c	Sequence of numbers 1 less than powers of 10	c	180, 360, 540, 720…..	c	$\frac{1}{n}$
d	Sequence of sum of interior angles of polygons	d	1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$	d	5n
e	Sequence of powers of 3	e	9, 99, 999, 9999……	e	3^n