

CHAPTER – 3
PLAYING WITH NUMBERS
MODULE – 1/2

INTRODUCTION:

- Let us take 6 marbles. What are the possible ways of arranging them in rows?
- If we arrange 1 in each row, there are 6 rows. 2 in a row then there are 3 rows, 3 in a row then there are 2 rows and 6 in a row there is only 1 row.
- 6 can be written as the product of two numbers in different ways:
 $6=1\times 6$; $6=2\times 3$; $6=3\times 2$; $6=6\times 1$
- 1,2,3 and 6 are exact divisors of 6 and 6 is the multiple of 1,2,3 and 6.

FACTORS:

- A factor of a number is an exact divisor
- 1 is a factor of every number
- Every number is a factor of itself
- Every factor is less than or equal to the given number
- Number of factors of a given number are finite

MULTIPLES:

- A number is a multiple of its factors
- Every multiple of a number is greater than or equal to that number
- Number of multiples of a given number is infinite
- Every number is a multiple of itself

PERFECT NUMBERS:

- A number for which the sum of all its factors is equal to twice the number is called a perfect number
- e.g. Factors of 6 are = 1,2,3 and 6
 $1+2+3+6=12=$ Twice the number 6

PRIME NUMBERS AND COMPOSITE NUMBERS:

- The number 1 has only one factor (i.e. itself)
- 2,3,5,7,11, etc are having exactly two factors 1 and the number itself
- There are numbers 4,6,8,9,10,12, etc having more than two factors

THINGS TO REMEMBER:

- 1 is neither prime nor composite
- Prime numbers: Numbers (other than 1) with only two factors namely 1 and itself
- Composite numbers: Numbers that have more than two factors

SIEVE OF ERATOSTHENES METHOD:

- **Step 1:** Cross out 1 because it is not a prime number.
- **Step 2:** Encircle 2, cross out all the multiples of 2, other than 2 itself, i.e. 4, 6, 8 and so on.
- **Step 3:** You will find that the next uncrossed number is 3. Encircle 3 and cross out all the multiples of 3, other than 3 itself.
- **Step 4:** The next uncrossed number is 5. Encircle 5 and cross out all the multiples of 5 other than 5 itself.

- **Step 5:** Continue this process till all the numbers in the list are either encircled or crossed out.
- All the encircled numbers are prime numbers. All the crossed-out numbers, other than 1 are composite numbers. This method is called the Sieve of Eratosthenes.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

THINGS TO REMEMBER:

- 2 is the smallest prime number and is even
- Every prime number other than 2 is odd
- Two prime numbers whose difference is 2 are called twin primes



THANK YOU