MATHEMATICS CLASS-VI

CLASSMATE
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Playing with numbers BY- PRASHANT

Factors and multiples

⇒ **Factor :-**

A factor of a number is an exact divisor of that number.

If 'a' and 'b' are two numbers and 'a' completely divides 'b' then 'a' is said to be factor of 'b'.

Ex :- Factor of 4 = 1, 2, 4
Factor of 6 = 1, 2, 3, 6

⇒ **Multiple :-**

If any number is multiply with a natural number, then we get the multiple of that number.

We can say that a number is a multiple of each of its factors.

Ex⇒ Multiple of 2 = 2, 4, 6, 8, 10 .....
Multiple of 3 = 3, 6, 9, 12, 15 .....

⇒ **Important points about factors and multiples**

1. 1 is a factor of every number.
2. Every number is a factor of itself.
3. Every factor of a number is an exact divisor of that number.
4. Every factor is less than or equal to the given number
5. Number of factors of a given number are finite.

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6. Every multiple of a number is greater than or equal to that number.
7. The number of multiples of a given number is infinite.
8. Every number is a multiple of itself.

⇒ Perfect number :-

A number for which sum of all its factor is equal to twice the number is called a perfect number.

Ex - 6 ; Sum of factors = 1+2+3+6 = 12 = 2×6

28 ; sum of factors = 1+2+4+7+14+28 = 56 = 2×28

⇒ Prime and Composite Numbers

* Prime numbers :-

The numbers other than 1 whose only factors are 1 and the number itself are called prime numbers

Ex :- 2, 3, 5, 7, 11 - - - - -

* Composite numbers :-

Numbers having more than two factors are called Composite numbers.

Ex :- 4, 6, 8, 9, 10, 12 - - - -

Important facts :-

1. The number 1, has only one factor, so it is neither prime nor composite.
2. No natural number is both prime and composite.
3. 2 is the only even prime number.

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Co-Prime :-

If two numbers do not have common factor other than one, they are called co-prime.

Ex :- (3,4), (2,3), (5,7)

⇒ Tests for Divisibility of Numbers

⇒ Divisibility by 2 :-

A number is divisible by 2, if it has any of the digits 0, 2, 4, 6 or 8 in its ones place.

Ex → 2546, 2618, 2400 are divisible by 2

⇒ Divisibility by 3 :-

If the sum of the digits is a multiple of 3, then the number is divisible by 3.

Ex :- 5463 ; here 5+4+6+3 = 18 so, it is divisible by 3.

⇒ Divisibility by 4 :-

A number with 3 or more digits is divisible by 4, if the number formed by its last two digits (i.e ones and tens) is divisible by 4 or zero.

Ex :- 500, 7824, 1296 are divisible by 4.

⇒ Divisibility by 5 :-

A number which has either 0 or 5 in its ones place is divisible by 5

Ex → 10, 25, 1230, 13735 are divisible by 5.

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⇒ Divisibility by 6 :-

If a number is divisible by 2 and 3 both then it is divisible by 6 also.

Ex :- 7212 is divisible by 6

⇒ Divisibility by 8 :-

A number is divisible by 8, if the number formed by the last three digits is divisible by 8.

Ex ⇒ 55328 is divisible by 8

⇒ Divisibility by 9 :-

If the sum of the digits of a number is divisible by 9, then the number itself is divisible by 9.

Ex :- 96408 is divisible by 9

because 9+6+4+0+8 = 27

⇒ Divisibility by 10 :-

If a number has 0 in the ones place then it is divisible by 10.

Ex :- 2450, 75890 etc.

⇒ Divisibility by 11 :-

If the difference between sum of digits at odd places and sum of digits at even places of the number is either 0 or divisible by 11, then the number is divisible by 11.

Ex :- 308, 1331, 61809 etc

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⇒ Important points :-

1. If a number is divisible by another number then it is divisible by each of the factors of that number.

2. If a number is divisible by two co-prime numbers then it is divisible by their product also.

3. If two given numbers are divisible by a number, then their sum is also divisible by that number.

4. If two given numbers are divisible by a number, then their difference is also divisible by that number.

⇒ Prime factor :-

A factor of given number is called a prime factor if this factor is a prime number.

Ex :- $12 = 2 \times 2 \times 3$, so, 2 and 3 are prime factors of 12.

⇒ Prime factorisation :-

To express a given number as a product of prime factors is called prime factorisation of the given number.

Ex :- $15 = 3 \times 5$

$75 = 3 \times 5 \times 5$

$60 = 2 \times 2 \times 3 \times 5$

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⇒ Highest common factor :→

The highest common factor (HCF) of two or more given numbers is the highest of their common factors.

Ex :→ 24 and 36 ; H.C.F = 12

15, 25, 30 ; H.C.F = 5

The HCF can also be found by prime factorisation of given numbers.

Ex → 12, 16, 28

2 | 12
2 | 6
3

2 | 16
2 | 8
2 | 4
2

2 | 28
2 | 14
7

12 = ② × ② × 3 16 = ② × ② × 2 × 2 28 = ② × ② × 7

H.C.F = 2 × 2 = 4

⇒ Lowest Common Multiple :→

The lowest common multiple (LCM) of two or more given numbers is the lowest of their common multiples.

Ex :- 8 and 12 ; L.C.M = 24

20, 25 and 30 ; L.C.M = 300

2 | 8, 12
2 | 4, 6
2 | 2, 3
3 | 1, 3
1, 1

L.C.M = 2 × 2 × 2 × 3
= 24

2 | 20, 25, 30
2 | 10, 25, 15
5 | 5, 25, 15
5 | 1, 5, 3
3 | 1, 1, 3
1, 1, 1

L.C.M = 2 × 2 × 3 × 5 × 5 = 300.

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