CHAPTER 1 Primes, HCF & LCM

1) Prime number : a whole number that has 2 factors only, which are 1 and itself.

Eg: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31...

Note: 0 and 1 are neither prime nor composite

2) Composite number : a whole number that has more than 2 factors.

Eg: 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20...

3) Prime factorisation means writing a composite number as a product of its prime factors.

Eg: Find the prime factorisation of 24.

Eg: Express 24 as a product of its prime factors in index notation.

} same question, asked differently.

Start with the smallest prime number

2	24
2	12 ← 24 ÷ 2
2	6
3	3
	1 ← Stop when we reach 1

This means "therefore" → $\therefore 24 = 2^3 \times 3$

4) Perfect square :

- A whole number whose square root is a whole number.
- A whole number that can be written as a whole number × the same whole number.
- A whole number in which the powers of its prime factors are all multiples of 2 / even.

Eg: 1, 4, 9, 16, a^2, b^4, $2^4 \times 7^6$

5) Perfect cube :

- A whole number whose cube root is a whole number.
- A whole number in which the powers of its prime factors are all multiples of 3.

Eg: 1, 8, 27, 4^3, x^9, $5^{15} \times 11^6$

6) Highest Common Factor (HCF) and Lowest Common Multiple (LCM)

Eg: Find the HCF and LCM of 36, 54, 90

Method 1

2	36, 54, 90 ← Divide each number by 2
3	18, 27, 45
3	6, 9, 15
	2, 3, 5 ← Stop when there is no common prime factor to divide

Common prime factors ← 2, 3

$\therefore$ HCF $= 2 \times 3^2$
$= 18$

and

LCM $= 2 \times 3^2 \times 2 \times 3 \times 5$
$= 2^2 \times 3^3 \times 5$
$= 540$

Method 2

$36 = 2^2 \times 3^2$
$54 = 2 \times 3^3$
$90 = 2 \times 3^2 \times 5$

} Step ①: Express each number in its prime factors

$\therefore$ HCF $= 2 \times 3^2$
$= 18$

} Step ② (HCF): ✓ Choose common prime factors (2, 3)
✓ Choose the lowest power for each prime factor

LCM $= 2^2 \times 3^3 \times 5$
$= 540$

} Step ② (LCM): ✓ Choose all prime factors (2, 3, 5
✓ Choose the highest power for each prime factor.