

Important Formulas – Class 10

Mathematics (Unit 1: Real Numbers)

1. Euclid's Division Lemma

For any two positive integers a and b , there exist unique integers q and r such that:
 $a = bq + r$, where $0 \leq r < b$

This is used to find the HCF (Highest Common Factor) of two numbers.

2. Fundamental Theorem of Arithmetic

Every composite number can be expressed as a product of prime numbers, and this factorisation is unique, except for the order of the factors.

3. HCF and LCM using Prime Factorisation

- HCF = Product of the lowest powers of all common prime factors.
- LCM = Product of the highest powers of all prime factors involved.

$$\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$$

4. Irrationality Proof (Theorem 1.2)

If p is a prime number and p divides a^2 , then p divides a .

This is used to prove that numbers like $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ are irrational.

5. Decimal Expansion of Rational Numbers

Let p/q be a rational number (in simplest form):

- If the denominator q has only the primes 2 and/or 5, the decimal expansion is terminating.
- If q has any prime factors other than 2 or 5, the decimal expansion is non-terminating repeating.