EMBIBE

Real numbers - Points to Remember

1. Euclid's division lemma:

For given positive integers a and b there exist whole numbers q and r satisfying $a=bq+r$, $0\leq r<b$.

2. Euclid's division algorithm:

To compute the H.C.F. of two positive integers say a and b, with $a>b$ by using Euclid's algorithm we follow the following steps:

STEP I: Apply Euclid's division lemma to a and b and obtain whole numbers q1 and r1 such that $a=bq1+r1$, $0\leq r1<b$.

STEP II: If $r1=0$, b is the H.C.F. of a and b.

STEP III: If $r1\neq 0$, apply Euclid's division lemma to b and r1 and obtain two whole numbers q2 and r2 such that $b=q2r1+r2$.

STEP IV: If $r2=0$, then r1 is the H.C.F. of a and b.

STEP V: If $r2\neq 0$, then apply Euclid's division lemma to r1 and r2 and continue the above process till the remainder rn is zero. The divisor at this stage i.e. rn-1, or the non-zero remainder at the previous stage, is the H.C.F. of a and b.

3. The Fundamental Theorem of Arithmetic:

Every composite number can be expressed (factorised) as a product of primes, and this factorisation is unique except for the order in which the prime factors occur.

Every composite number can be uniquely expressed as the product of powers of distinct primes in ascending or descending order.

4. Properties of Prime Numbers:

(i) There are infinitely many positive primes.

(ii) A positive integer *n* is prime, if it is not divisible by any prime less than or equal to n.

(iii) If p is a positive prime, then p is an irrational number.

5. Terminating Decimal:

Let $x=pq$ (where p, q are integers and $q\neq 0$) be a rational number, such that the prime factorisation of q is of the form $2m\times 5n$ where m, n are non-negative integers. Then, x has a terminating decimal expansion which terminates after k places of decimals, where k is the larger of m and n.

6. Non-terminating Decimal:

Let $x=pq$ (where p, q are integers and p, $q\neq 0$) be a rational number, such that the prime factorisation of q is not of the form $2m\times 5n$, where m, n are non-negative integers. Then, x has a non-terminating repeating decimal expansion.