Number System

MATHEMATICS Comprehensive

All the numbers we have studied so far are real numbers. The real numbers are divided into two categories which are rational and irrational numbers. All the positive numbers used for counting are called the natural numbers. These start from 1 and end till infinity. The positive numbers which start from zero are called whole numbers. The collections of natural numbers,

NOTES

their negatives along with the number zero are called integers. Rational numbers are the numbers in the form $\frac{p}{q}$ where $q \neq 0$

and p, q are integers and irrational q numbers are the numbers which cannot be written in the form p-, where p and q are integers and $q \neq 0$.

Decimal Expansion of Rational Numbers

There are rational numbers which can be expressed as terminating decimals or non- terminating decimals. The non-terminating decimals may be repeating or non- repeating. The rational numbers whose denominators are of the form $2^{m}5^{n}$ (where m and n are whole numbers) are terminating and rest are non-terminating decimals.

Euclid's Division Lemma

For any two positive integers, say x and y (x > y), there exists unique integers say k and r satisfying x = ky + r where $0 \le r < y$.

By using Euclid's division algorithm, we can find the greatest common divisor of two numbers.

Note:

- A lemma is a proven statement used for proving another statement.
- An algorithm is a series of well defined steps which gives a procedure for solving a type of problem.

Example:

Find the HCF of 378 and 1260.

(a) 252	(b) 126
(c) 378	(d) 63
(e) None of these	

Ans. (b)

Explanation: By using Euclid's division lemma, we get $1260 = 378 \times 3 + 126$ now consider the divisor and remainder.

So again by applying Euclid's division lemma, we get $378 = 126 \times 3 + 0$

Now the remainder is zero, so we stop the process.

The divisor at this stage is 126. So, HCF of 378 and 1260 is 126.