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REAL NUMBERS

PPT-4

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 01
CHAPTER NAME : REAL NUMBERS

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PREVIOUS KNOWLEDGE TEST :

- An algorithm is a series of well defined steps which gives a procedure for solving a type of problem
- A lemma is a proven statement used for proving another statement.
- A natural number which has exactly two factors, i.e. 1 and the number itself, is a **prime number**.
- Every non-prime number is a composite number. **Composite numbers** are those natural numbers which have more than two factors. Such numbers are divisible by other numbers as well.

Learning outcome

1. Students will be able to **define** fundamental theorem of arithmetic
2. Students will be able to **find** HCF and LCM of numbers using prime factorization and the Establish relationship among them.
3. Students will be able to **solve** real life examples involving HCF & LCM.

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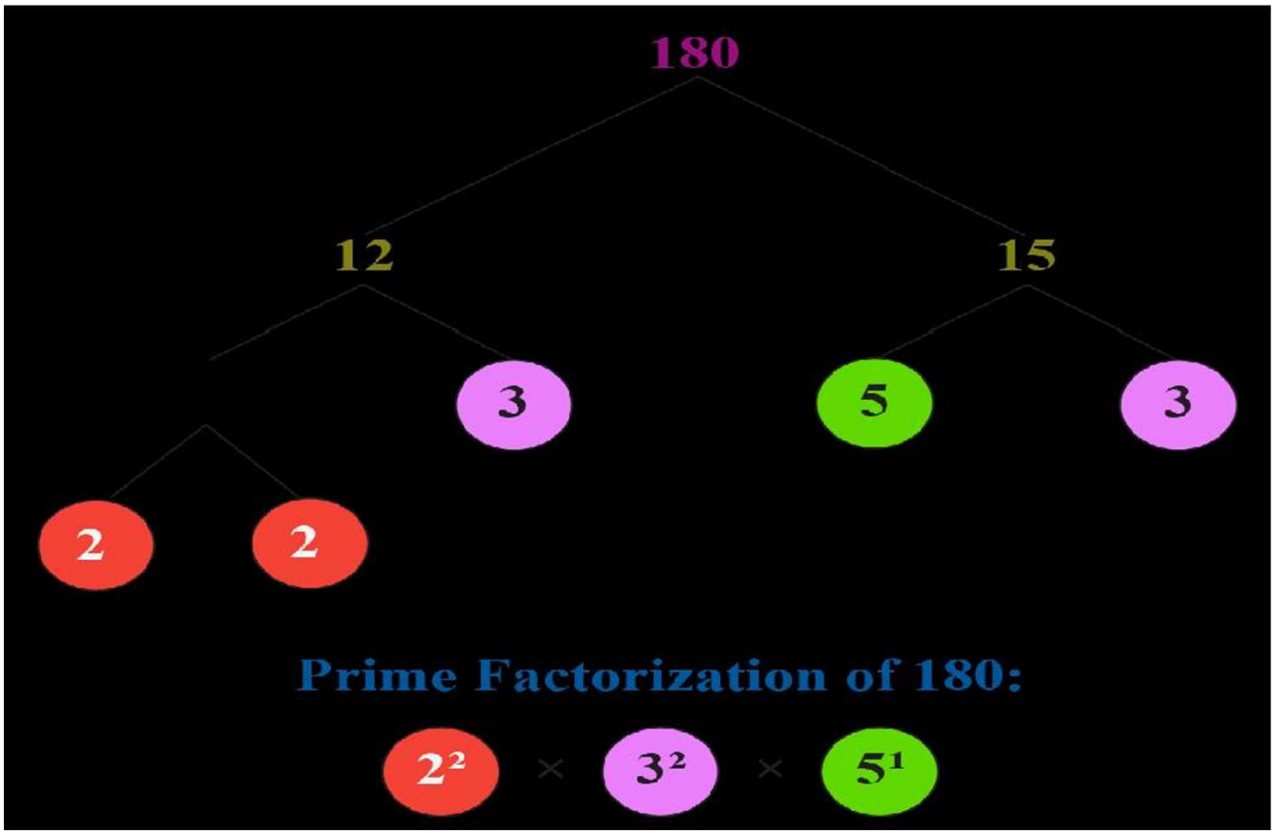
Fundamental Theorem of Arithmetic

- Theorem 1.2 (Fundamental Theorem of Arithmetic) : Every composite number can be expressed (factorized) as a product of primes, and this factorization is unique, apart from the order in which the prime factors occur.

For example,

- 315 = 3 x 3 x 5 x 7
- 360 = 2 x 2 x 2 x 3 x 3 x 5

Prime factorisation by factor tree method



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

The HCF of two or more numbers is the greatest number that divides each one of them exactly.

LCM (Lowest Common Multiple)

The least number which is exactly divisible by each one of the given numbers is called LCM.

HCF – Product of least powers of common factors

LCM – Product of highest powers of all the distinct primes.

Find the HCF and LCM of 6, 72 and 120 using prime factorization method.

$$6 = 2 \times 3$$
$$72 = 2^3 \times 3^2$$
$$120 = 2^3 \times 3 \times 5$$

Here, $2^1 \times 3^1$ are the smallest powers of the common factors 2 and 3

HCF = $2^1 \times 3^1 = 6$

Now $2^3 \times 3^2 \times 5'$ are the greatest power of the prime factors 2, 3, 5 respectively involved in 6, 72 an 120

LCM = $2^3 \times 3^2 \times 5^1 = 360$

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Find the HCF and LCM of 26 and 91 and verify LCM x HCF = product of two numbers.

$26 = 2 \times 13$

$91 = 7 \times 13$

HCF = 13

LCM = $2^1 \times 7^1 \times 13^1 = 182$

LCM x HCF = 182 x 13 = 2366

Product of two numbers = 26 x 91 = 2366

LCM x HCF = Product of two numbers

HCF x LCM = Product of two numbers

$$\text{HCF} = \frac{\text{Product of two numbers}}{\text{LCM}}$$

$$\text{LCM} = \frac{\text{Product of two numbers}}{\text{HCF}}$$

The product of two positive integers is equal to product of their HCF and LCM but the same is not true for 3 or more positive integers.

Given that HCF (306, 657) = 9. Find LCM

$$\text{LCM} = \frac{\text{Product of two numbers}}{\text{HCF}}$$

$$= \frac{306 \times 657}{9}$$

$$= 34 \times 657$$
$$= 22{,}338$$

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Show that 6^n cannot end with the digit O for any natural number n.

$6^n = 2^n \times 3^n$

Prime factorization of 6^n contain only 2 and 3. (uniqueness of FTA)

5 does not occur in the prime factorization of 6^n

Therefore, 6^n cannot end with the digit O for any natural number n.

Home assignment

- HW- Ex. 1.2 Q. No 1 to 7.

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THANKING YOU

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