REAL NUMBER

IMPORTANT CONCEPTS
TAKE A LOOK

1. **Euclid's Division lemma or Euclid's Division Algorithm:-**

   For any two given Positive integers a and b there exits unique whole number q and r such that.
   $a=bq+r$, where $0\leq r<b$

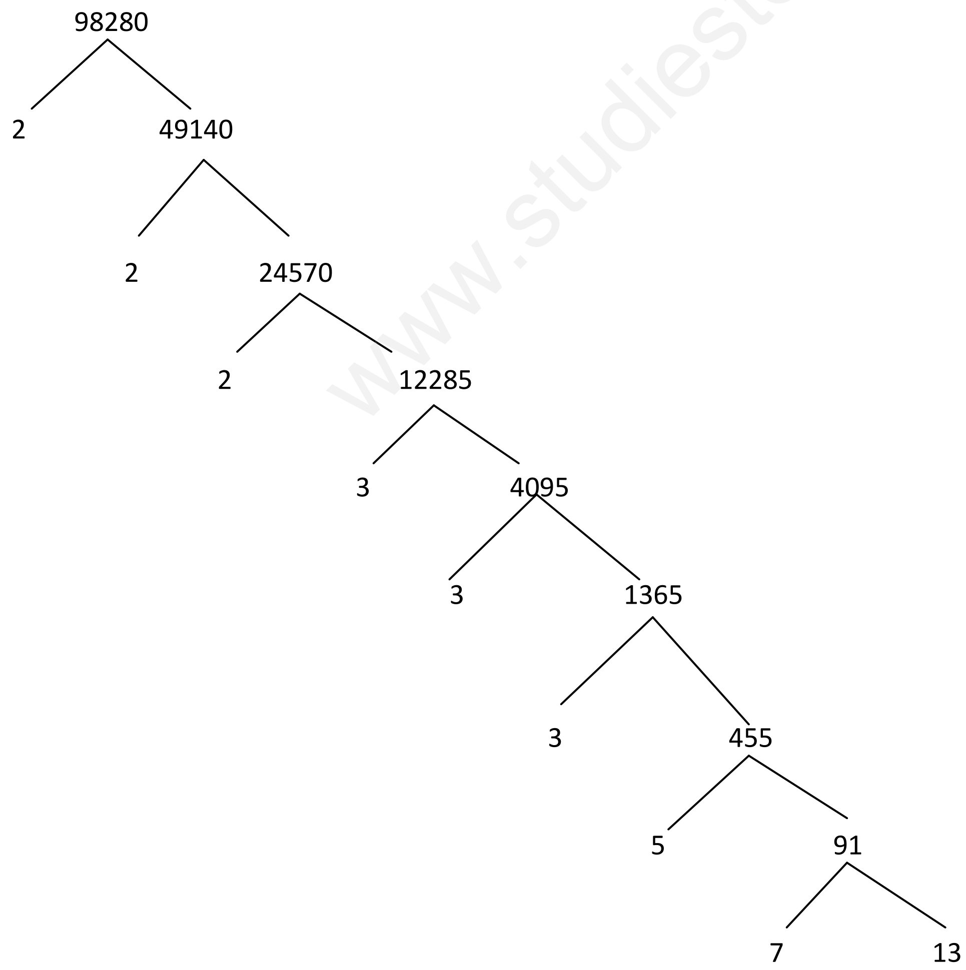
   Here, we call a as dividend, b as divisor q, as quotient and r as remainder.
   Dividend=(divisor x quotient)+ Remainder.

2. **Algorithm:-** Algorithm is a series of well defined steps which gives procedure for solving a type of problem.

3. **Lemma:-** A lemma is a proven statement which is used to prove another statement.

4. **Euclid's division Algorithm:-** It is a technique to compute (Calculate or find) the Highest common factor (HCF) of two given positive integers.

5. Fundamental theorem of Arithmetic:-
   Every composite number can be expressed as a product of primes, and their factorization is unique, apart from the order in which the prime factor occur. For example 98280 can be factorized as follows:-



Therefore $98280=2^3 \times 3^3 \times 5 \times 7 \times 13$ as a product of power of primes.

6. Rational Number and their Decimal Expansion:-

i. If a=p/q, where p and q are co- prime and $q=2^n \times 5^m$(n and m whole numbers) then the rational number has terminating decimal expansion.

ii. If a=p/q where p and q are co- prime and q cannot be written as $2^n x5^m$ (n and m whole number) then the decimal expansion of a has non-terminating repeating decimal expansion.

LEVEL-I

1. Euclid's Division lemma states that for any two positive integers a and b, there exist- unique integers q and r such that a=bq+r, where r must satisfy. Ans-$0 \le r < b$.

2. Express 10010 and 140 as prime factors. Ans-10010=2x5x7x11x13
140=2x2x5x7

3. If p/q is a rational number (q≠0), what is the condition of q so that the decimal representation of p/q is terminating?
Ans-Q should be in the form of
$2^n x5^m$ where n and m are +ve integer.

4. Write any one rational number between √2 and √3. Ans-1.5321

5. Find the [HCF x LCM] for 105 and 120. Ans-12600

6. If two numbers are 26 and 91 and their H.C.F is 13 then LCM is. Ans-182

7. The decimal expansion of the rational number $33/2^2.5$ will terminate. Ans-Two decimal places

8. HCF of two consecutive integers x and x+1 is. Ans-1

LEVEL-II

Q1. Use Euclid division algorithm to find the HCF of:-
i) 196 and 38220 ii)867 and 225 Ans:-i)196 ii)51

Q2. Find the greatest common factor of 2730 and 9350. Ans-10

Q3. IF HCF (90,144)=18 find LCM (90,144) Ans-720

Q4.Is 7x5x3x2+3 is a composite number? Justify your answer. Ans-213

Q5. Write 98 as product of its prime factors. Ans-2x7x7

Q6. Find the largest number which divides 245 and 1245 leaving remainder 5 in each case. Ans-40

Q7. There is a circular path around a sports field. Geeta takes 20 minutes to drive one round of the field. While Ravi takes 14 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at staring point?
Ans-42 minutes

Level-III

1. Using Euclid's division lemma, show that the cube of any positive integer is of the form 9q, 9q+1 or 9q+8 for some integer 'q'.
2. Show that one and only one out of n,n+2,n+4 is divisible by 3.
3. Prove that 5+√3 is an irrational no.
4. Using Euclid's algorithm find the HCF of the following 4052 and 12576
   Ans-4
5. Show that the square of any odd integer is of the form 4q+1 for some integer q.
6. Prove that √5+√3 is irrational.

Self evaluation questions

1. Draw the factor tree for 678.
2. The sum of two numbers is 1660 and HCF is 20 find the numbers.
3. Prove that √7 is irrational number.
4. Prove that $\frac{3}{2\sqrt{5}}$ is irrational number.
5. Write $\frac{2}{13}$ in decimal form and comment on decimal expansion.
6. If $\sqrt{ab}$ be an irrational number prove that $\sqrt{a}+\sqrt{b}$ is irrational.
7. Show that any positive odd integer will be of the form 4q+1 or 4q+3 where q is some integer.