TRINITY COLLEGE FOR WOMEN
NAMAKKAL
Department of Mathematics

NUMBER THEORY
21UMA05 - Odd Semester

Topic: Euclid's Division Algorithm

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Euclid's Division Algorithm

* For two positive integers a & b where a>b, they can be expressed as

$$a=(b*q)+r$$

* where $0 \le r < b$ and $q \in Z$. If "r=0" then "b" is the HCF/GCD of "a & b"

* If “$r \neq 0$“ then apply Euclid’s division lemma to b and r.

$$b=(r*m)+n$$

* For some integers m and n,$0 \leq n < r$
* Continue this process till the remainder is zero.

Dividend = Divisor × Quotient + Remainder

$130 = 91(1) + 39$

$91 = 39(2) + 13$

$39 = 13(3) + 0$

H.C.F

2. Find the largest number the divides 2623 and 2011 and leaves remainders 5 and 9 respectively.

Solution:

since, 2623 and 2011 when divided leaves remainder 5 and 9.

we have to find HCF of

2623-5=2618.

And HCF of2011-9=2002, so we consider the numbers 2618 and 2002.

Now applying Euclid's lemma to 2618 and 2002 we get,

2618=2002*1+616

As $r \neq 0$ *we a*gain apply Eulid's lemma to 2002 and 616.

we have 2002=616*3+154 as wee that

$r \neq 0$.

Applying Eulid's lemma again to 6156 and 154 we get,

$$616=154*4+0$$

Now, Remainder (r)=0

Hence, according to the algorithm the divisor=HCF/GCD

Therefore,

154=HCF of 2618 and 2002.

Hence,

the required number is 154.

Revision:

1. Arranging the terms in the given equation as per the Euclid's Division Lemma general equation

$$a=b*q+r$$

2. Identification of the Dividend, Divisor, Quotient and Remainder.

3. Any positive integer can be represented as '2q' or '2q+1'.

THANK YOU

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