NORTH EX PUBLIC SCHOOL
(Senior Secondary,Affiliated to CBSE)
(School block, Jain Nagar Sector-38, Rohini, Delhi-81)
CLASS-X
SUBJECT-MATHS
CHAPTER-1 REAL NUMBERS

TOPICS/ INTRODUCTION:

1. Natural Numbers: Numbers from 0 (zero) onward are known as Natural numbers, denoted by 'N'.
N = {1, 2, 3, 4,.....}

2. Whole Numbers: Numbers from 0 (zero) onward are known as Whole numbers, denoted by 'W'.
W = {0, 1, 2, 3, 4, ...}
3. Integers: The collection of all whole numbers and negative of natural numbers are called Integers, denoted by 'Z' or 'I'.
Z or I = {..... −3, −2, −1,0,1,2,3 .....}

4. Rational Number: A number which can be expressed as $\frac{p}{q}$ where q ≠ 0 and q, q εZ is know as rational number, denoted by 'Q'.
5. Irrational Number: A number which can't be expressed in the form of p/q and its decimal representation is non-terminating and non-repeating is known as irrational number.
e.g., $\sqrt{2}$, $\sqrt{3}$, π,... 1.732105, etc.

Rational numbers

(A) Terminating rational numbers: Remainder becomes 0 after some steps of division in decimal form. For ex- =0.25

(B)Non terminating recurring(repeating) numbers: Remainder never becomes 0 after division in decimal form . for ex: = 0.333....

Irrational number: Non terminating non recurring.for ex: , ,

Note that square root numbers which are not perfect squares are irrational.

is a perfect sq. of 8, so this is rational.

CONCEPT: EUCLID'S DIVISION LEMMA

This is the technique to compute the HCF of two given positive integers which represents in the form of a=bq+r, where a and b are integers and 0 ≤ r < b, q denotes quotient and r denotes remainder.

By division algorithm: Dividend= quotient x divisor + remainder

So observe that remainder is always less than and equal to divisor in the process of division.

Some related examples are as follows:

Q1. Find the HCF of following numbers by Euclid's division algorithm.

(a) 135 and 225 (b) 196 and 38220

Sol: (i) 135 and 225

Step 1: Since 225 > 135, apply Euclid's division lemma, to a =225 and b=135 to find q and r ,
On dividing 225 by 135 we get quotient as 1 and remainder as 90
225 = 135 x 1 + 90

Step 2: Remainder r which is 90 ≠ 0, we apply Euclid's division lemma to b =135 and r = 90
On dividing 135 by 90 we get quotient as 1 and remainder as 45 135 = 90 x 1 + 45

Step 3: Again remainder r = 45 $\neq$ 0 so we apply Euclid's division lemma to b =90 and r = 45
On dividing 90 by 45 we get quotient as 2 and remainder as 0
90 = 2 x 45 + 0

Step 4: Since the remainder is zero, the divisor at this stage will be HCF of (135, 225).

Since the divisor at this stage is 45, therefore, the HCF of 135 and 225 is 45.

(ii) 196 and 38220

Step 1: Since 38220 > 196, apply Euclid's division lemma
to a =38220 and b=196 to find whole numbers q and r such that

On dividing 38220 we get quotient as 195 and remainder r as 0
38220 = 196 x 195 + 0
Since the remainder is zero, divisor at this stage will be HCF
Since divisor at this stage is 196 , therefore, HCF of 196 and 38220 is 196.

NOTE: HCF(a,b) = a if a is a factor of b. Here, 196 is a factor of 38220 so HCF is 196.

Q2. Find the LCM and HCF of the given numbers by prime factorisation and verify that LCM x HCF=Product of two numbers.

(ii) 510 and 92

$510 = 2 \times 3 \times 5 \times 17$

$92 = 2 \times 2 \times 23$

HCF = 2

$LCM = 2 \times 2 \times 3 \times 5 \times 17 \times 23 = 23460$

Product of the two numbers = $510 \times 92 = 46920$

$HCF \times LCM = 2 \times 23460$

$= 46920$

Hence, product of two numbers = HCF $\times$ LCM

Q3. Find the LCM and HCF of the given numbers.

12,15 and 21

Sol: $12=2^2 \times 3$

15=3x5

21=3x7

HCF=3

$LCM=2^2 \times 3 \times 5 \times 7=420$

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WORKSHEET- 2, 2020-21

Do all the sums in a notebook.

1. Use Euclid's division algorithm, find the HCF of following :
   (a) 867 and 255 (b) 4052 and 12576
2. Express the following numbers as product of prime factors.
   (a) 3825 (b) 7429 (c) 156
3. Find the LCM and HCF of following numbers by prime factorisation:
   (a) 336 and 54 (b) 17,23 and 29
4. Find the HCF by long division method.
   (a) 96 and 404 (b) 72 and 120
5. Find LCM and HCF of the given numbers and verify LCM x HCF =Product of two numbers.
   (a) 384 and 24 (b) 26 and 91