BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT:-MATHEMATICS

CHAPTER:- PLAYING WITH NUMBERS

PART-7

TOPIC: HCF AND LCM

GUIDELINES:

Dear Students

Kindly refer to the following notes/video links from the Chapter- "PLAYING WITH NUMBERS", SUB TOPIC- "HCF and LCM , PART-7 " and thereafter do the questions in your Maths notebook.

LINK FOR THE CHAPTER:- http://ncert.nic.in/textbook/textbook.htm?femh1=3-14

INTRODUCTION :-

We have studied how to find COMMON FACTORS and COMMON MULTIPLES. Let's proceed to the **Highest Common Factor** (**HCF**) and the **Least Common Multiple** (**LCM**).
Learning the application of a concept helps you fully understand the topic, and also makes it interesting. There are various interesting applications of LCM and HCF. Let us learn about them.

SUB TOPIC

- **HIGHEST COMMON FACTOR (HCF)**
  - Common factor method
  - Prime factorization method

- **LOWEST COMMON MULTIPLES (LCM)**
  - Common multiple method
  - Prime factorization method
  - Common division method of prime factorisation

KEY POINTS

- **HIGHEST COMMON FACTOR:**

(HCF) of two or more given numbers is the highest (or greatest) of their common factors.

To find the HCF of two or more numbers, we can use any of the following methods:

- **COMMON FACTOR METHOD**
  (click on the link- https://www.youtube.com/watch?v=lCFsjbGzK4o)

- **PRIME FACTORIZATION METHOD**
  (click on the link- https://www.youtube.com/watch?v=WF90zmBhv0c)

Method 1: using all factors

1. List the factors for each number.
   24 1, 2, 3, 4, 6, 8, 12, 24
   36 1, 2, 3, 4, 6, 9, 12, 18, 36.

2. List the common factors.
   (the ones they both have)   1, 2, 3, 4, 6, 12

3. Circle the highest common factor.   1, 2, 3, 4, 6, (12)

   HCF = 12

Method 2: using prime factors

1. List the prime factors for each number.
   24 2 x 2 x 2 x 3
   36 2 x 2 x 3 x 3

2. List the common prime factors.   2 x 2 x 3

3. Multiply the common prime factors.   2 x 2 x 3 = 12

   HCF = 12

SOLVED NCERT QUESTIONS: https://www.youtube.com/watch?v=7QMHNr93B2M)

Application question:

A fruit seller has 24 apples, 40 papaya and 56 strawberries which he must use to create fruit baskets. What is the largest number of fruit baskets she can make, without having any fruit left over ?

Number of fruits of each type :

Apples   : 24 = 2 x 2 x 2 x 3
Papaya   : 40 = 2 x 2 x 2 × 5
Strawberries : 56 = 2 x 2 x 2 × 7

HCF = 2 x 2 x 2 = 8

A fruit seller can make 8 fruit baskets.

Each basket will have-

3 Apples (Since 24 ÷ 8 = 3);
5 Papayas (Since 40 ÷ 8 = 5);
7 Strawberries (Since 56 ÷ 8 = 7)

• **Lowest Common Multiple (LCM)**

The Lowest Common Multiple (LCM) of two or more given numbers is the lowest (or smallest or least) of their common multiples.

If two numbers are co-prime then the LCM is the product of the two numbers.

To find the HCF of two or more numbers, we can use any of the following method:

- **Common multiple method**
  (Click on the link:https://www.youtube.com/watch?v=i5GgZCiMZ9s)

- **Prime factorization method**
  (Click on the link: https://www.youtube.com/watch?v=aAnfbsViTCA)

- **Common division method of prime factorisation**
  (Click on the link: https://www.youtube.com/watch?v=0GQqxXlKrj8)

Method:1

This method works only when there are very small numbers.

Method:2
PRIME FACTORIZATION

$$
\begin{array}{r|l}
2 & 72 \\ \hline
2 & 36 \\ \hline
2 & 18 \\ \hline
3 & 9 \\ \hline
3 & 3 \\ \hline
& 1
\end{array}
\qquad
\begin{array}{r|l}
2 & 48 \\ \hline
2 & 24 \\ \hline
2 & 12 \\ \hline
2 & 6 \\ \hline
3 & 3 \\ \hline
& 1
\end{array}
$$

Prime factors of

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$
$$48 = 2 \times 2 \times 2 \times 2 \times 3$$

LCM=2X2X2X3X3X2
=144

Method:3

LCM using Repeated Division
Find the LCM of 24 and 36

```
2 | 24   36
2 | 12   18
3 |  6    9
  |  2    3
```

LCM: 2 x 2 x 3 x 2 x 3 = 72

1. Divide by the least prime number which divides at least one or both of the given numbers. Here, it is 2.

2. Again divide by 2.

3. Divide by next prime number which is 3. Here 3 divides both the given numbers.

4. Divide by next prime number which is 2 and 3.

APPLICATION QUESTION:

Find the least number which when divided by 12, 15, 18 and 20 leaves a remainder 5 in each case.

SOLUTION:

Here, we will find LCM of 12, 15, 18 and 20.

2	12, 15, 18, 20
2	6, 15, 9, 10
3	3, 15, 9, 5
3	1, 5, 3, 5
5	1, 5, 1, 5
	1, 1, 1, 1

By finding LCM we will get a common multiple which will be divisible by the given numbers.

Thus**, LCM = 2 x 2 x 3 x 3 x 5 = 180**

180 is the least number which when divided by the given numbers will leave remainder 0 in each case.

Therefore, the required number is 5 more than 180.

The required least number = 180 + 5 = 185

(Questions on Application of LCM and HCF: https://www.youtube.com/watch?v=yzy-yjenxqQ)

Points to remember-

➢ **HCF of two or more given numbers is the highest (or greatest) of their common factors.**

➢ **The Lowest Common Multiple (LCM) of two or more given numbers is the lowest (or smallest or least) of their common multiples.**

➢ **If two numbers are co-prime then the LCM is the product of the two numbers.**

ASSIGNMENT :-
From NCERT textbook the following questions are to be done in Mathematics notebook:
Exercise 3.6 : Q1 (e , f , g ,h ;Q2
Exercise 3.7 : Q 3 , 4 , 5 ,6 ,7, 9

PRACTICE QUESTIONS

ATTEMPT MCQ ON:
HCF-
https://www.khanacademy.org/math/in-in-class-6th-math-cbse/x06b5af6950647cd2:playing-with-numbers/x06b5af6950647cd2:highest-common-factor/e/greatest_common_divisor?modal=1

LCM-
https://www.khanacademy.org/math/in-in-class-6th-math-cbse/x06b5af6950647cd2:playing-with-numbers/x06b5af6950647cd2:lowest-common-multiple/e/least_common_multiple?modal=1