# Lowest Common Multiple (LCM)

The Lowest Common Multiple (LCM) of two or more numbers is the smallest multiple that is common to all of them. In other words, the LCM is the smallest number that both (or more) numbers can divide into evenly. It is also the first common multiple of the given numbers.

For example, the LCM of 3 and 4 is 12 because 12 is the smallest number that both 3 and 4 can divide into without leaving a remainder. The multiples of 3 are: 3, 6, 9, 12, 15, 18, etc., and the multiples of 4 are: 4, 8, 12, 16, 20, etc. The smallest common multiple is 12.

#### How to Find the LCM?

There are two main methods for finding the LCM:

**Listing Multiples:** List the multiples of each number and find the smallest common multiple.

**Prime Factorisation:** Find the prime factorisation of each number, then take the highest power of each prime factor that appears in any of the numbers. Multiply these together to get the LCM.

### **Properties of LCM**

- LCM is always greater than or equal to the greatest number: The LCM is never smaller than the largest number involved.
- The LCM of two numbers is a multiple of each of the numbers: The LCM is always divisible by each number.
- LCM can be used to find the common time period for repeating events: For example, if two events repeat every 3 days and every 4 days, the LCM helps us find the first time both events will happen on the same day.

#### Example 1

Question: Find the LCM of 6 and 8 using the listing method.

Solution:

**Step 1:** List the multiples of 6:

6, 12, 18, 24, 30, 36, 42, 48, 54, 60, ...

**Step 2:** List the multiples of 8:

8, 16, 24, 32, 40, 48, 56, 64, 72, ...

Step 3: Identify the common multiples:

Common multiples: 24, 48, 72, ...

**Step 4:** The smallest common multiple is 24.

Answer: The LCM of 6 and 8 is 24.

## Example 2

**Question:** Find the LCM of 4 and 5 using the prime factorisation method.

# Solution:

**Step 1:** Find the prime factorisation of 4:

4 = 2 × 2.

**Step 2:** Find the prime factorisation of 5:

5 = 5 (since 5 is a prime number).

**Step 3:** Take the highest power of each prime factor that appears in any of the numbers:

For 2, the highest power is  $2^2$  (from 4).

For 5, the highest power is 5 (from 5).

**Step 4:** Multiply the highest powers of the prime factors:

 $LCM = 2^2 \times 5 = 4 \times 5 = 20.$ 

Answer: The LCM of 4 and 5 is 20.

# **Summary Points**

- The LCM is the smallest multiple that is common to two or more numbers.
- You can find the LCM by listing the multiples or using prime factorisation.
- The LCM is always greater than or equal to the largest number involved.
- The LCM helps find the common time or space for repeating events or actions.