Finding LCM by Prime Factorisation

Understanding LCM by Prime Factorisation

- LCM (Least Common Multiple) is the smallest number that is a multiple of two or more numbers.
- One way to find LCM is by using prime factorization.
- We break each number into its prime factors.
- Then, we take all the prime numbers used, with the highest powers (the most times they appear).
- Multiply them to get the LCM.

Steps to Find LCM by Prime Factorisation

- **Step 1:** Find prime factorisation of each number
- **Step 2:** List all prime numbers used
- **Step 3:** Choose the highest number of times each prime appears
- **Step 4:** Multiply them together to get the LCM

Examples with Solutions

Example: Find LCM of 4 and 6

$4 = 2 \times 2$

$6 = 2 \times 3$

Take all prime numbers: 2 (used twice), 3 (used once)

$LCM = 2 \times 2 \times 3 = 12$

Example: Find LCM of 8 and 12

$8 = 2 \times 2 \times 2$

$12 = 2 \times 2 \times 3$

Take highest powers: $2 \times 2 \times 2 \times 3$

$LCM = 24$

Example: Find LCM of 10 and 15

$10 = 2 \times 5$

$15 = 3 \times 5$

Take all primes: 2, 3, 5

LCM = $2 \times 3 \times 5 = 30$

Example: Find LCM of 9 and 6

$9 = 3 \times 3$

$6 = 2 \times 3$

Take highest powers: $2, 3 \times 3$

LCM = $2 \times 3 \times 3 = 18$

Example: Find LCM of 5 and 20

$5 = 5$

$20 = 2 \times 2 \times 5$

Take highest powers: $2 \times 2 \times 5$

LCM = 20

Summary Points

- LCM is the smallest number that is a multiple of all given numbers.
- Prime factorisation helps break numbers into smaller parts.
- Use the highest power of each prime factor.
- Multiply all selected primes to get the LCM..
- This method is useful for larger numbers and accurate calculation