RUNNING HEAD: PRIME FACTORIZATION.

**Mathematics**

Student’s name

Institution affiliations

Course

Date

[Year]

Prime factorization is a powerful mathematical tool for finding the greatest common factor (GCF) and least common multiple (LCM) of two or more numbers. Prime factorization involves expressing a number as the product of its prime factors, the prime numbers that multiply together to give the original number.

To understand how prime factorization is essential in finding the GCF, consider two numbers, A and B. The prime factorization of each number is RECOVERED by breaking it down into its prime factors. For instance, if A = 24, its prime factorization is 2 x 2 x 2 x 3. Similarly, if B = 36, its prime factorization is 2 x 2 x 3 x 3.

The GCF is the product of the common prime factors raised to the lowest power. In this example, the common prime factors are 2 and 3. The GCF is ACQUIRED by taking the minimum power for each prime factor: GCF (A, B) = 2 x 2 x 3 = 12.

For finding the LCM, prime factorization is again a key step. The LCM is the product of all prime factors raised to the highest power. Using an exact example, the LCM (A, B) is obtained by taking the maximum power for each prime factor: LCM (A, B) = 2 x 2 x 2 x 3 x 3 = 72. Here, prime factorization helps identify all unique prime factors and determine their highest occurrences.

. REFERENCES

Landau, E. (2021). *Elementary number theory* (Vol. 125). American Mathematical Society