HOW PRIME FACTORIZATION IS USEFUL TO FIND THE GREATEST COMMON FACTOR AND LEAST COMMON MULTIPLE.

Prime factorization is a method used to express a number as the product of its prime factors. The prime factors of a number are the prime numbers that divide the given number exactly, without any remainder.

To find the greatest common factor (GCF) of two or more numbers using prime factorization, you need to find the common prime factors shared by all the numbers. The GCF is then obtained by multiplying these common prime factors together. For example, let's find the GCF of 12 and 18 using prime factorization:

Prime factorization of 12: 2 * 2 * 3 Prime factorization of 18: 2 * 3 * 3

The common prime factors are 2 and 3. Multiplying the common prime factors gives us the GCF: $GCF(12, 18) = 2 \times 3 = 6$.

To find the least common multiple (LCM) of two or more numbers using prime factorization, you need to find the prime factors of each number and then choose the highest power of each prime factor that appears in any of the numbers. The LCM is obtained by multiplying these prime factors together. Let's find the LCM of 12 and 18 using prime factorization:

Prime factorization of 12: 2 * 2 * 3 Prime factorization of 18: 2 * 3 * 3

Taking the highest power of each prime factor gives us: $LCM(12, 18) = 2^2 * 3^2 = 36$.

In summary, prime factorization is useful in finding the GCF by identifying the common prime factors, and it is also useful in finding the LCM by selecting the highest power of each prime factor present in the numbers.