Fundamental Theorem of Arithmetic:

Every positive integer greater than 1 is either a prime number or can be written as a product of prime numbers. Furthermore this factorization is unique except for the order. Fore example, we can write

$6936 = 2^3 \cdot 3 \cdot 17^2$, or $1200 = 2^4 \cdot 3 \cdot 5^2$

and there are no other possible factorizations of 6936 or 1200 into prime numbers, if we ignore the ordering of the factors.

That is, for each positive integer *n*, there exists unique prime numbers p_1 , p_2 ,... p_k and positive integers i_1 , i_2 ,... i_k such that

$$p_1 < p_2 < p_3 < \ldots < p_k \quad \text{and} \quad n = p_1^{i_1} \cdot p_2^{i_2} \cdot p_3^{i_3} \ \ldots \ p_k^{i_k} \ .$$

The proof of this theorem is obtained by using mathematical induction.