1. Prove the **Main Factorization Theorem**: Every composite number can be **factored uniquely** into prime factors.

2. Explain its **General Form** below and give few examples of prime numbers and their representation.

   $$n = \prod_p p^{\alpha_p} \text{ for } p \in P, \alpha_p \geq 0$$

   and this representation is unique.

3. Prove that for any \(a,b,k \in \mathbb{Z}\)

   $$\gcd(ka, kb) = k \cdot \gcd(a, b).$$
Solution space