

Name _____

Cracking the Code: The Fascinating World of the Fundamental Theorem of Arithmetic

Short Answer Key

1. The Fundamental Theorem of Arithmetic states that every integer greater than 1 can be expressed uniquely as a product of prime numbers.
2. The theorem ensures the uniqueness of prime factorization by stating that any whole number greater than 1 can be broken down into a unique combination of prime factors, and this decomposition is unique up to the order of the factors.
3. The Fundamental Theorem of Arithmetic is important in cryptography because it allows for the creation of encryption algorithms that rely on the unique prime factorization of numbers to secure sensitive information.
4. Example: The number 24 can be expressed as $2 \times 2 \times 2 \times 3$, which is its unique prime factorization.
5. Understanding the theorem helps mathematicians study the properties of numbers by providing a systematic way to break down numbers into their prime components, allowing for deeper analysis and exploration.

