Prime Factorization Worksheet

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Part 1: Building a Foundation

What is a prime number?

Hint: Think about the definition of prime numbers.

- ◯ A) A number that can be divided by 1 and itself only
- ◯ B) A number that can be divided by 2 and 3
- ◯ C) A number that has more than two factors
- ◯ D) A number that is even

Which of the following numbers are prime? (Select all that apply)

Hint: Identify the numbers that meet the criteria for being prime.

- ☐ A) 2
- ☐ B) 4
- ☐ C) 11
- ☐ D) 15

Explain the process of prime factorization in your own words.

Hint: Consider how you would break down a number into its prime factors.

List the prime factors of the following numbers:

Hint: Break down each number into its prime components.

1. 18

2. 30

Part 2: Understanding and Interpretation

Which method involves creating a tree diagram to break down a number into its prime factors?

Hint: Think about visual methods for factorization.

- ◯ A) Division Method
- ◯ B) Factor Tree Method
- ◯ C) Subtraction Method
- ◯ D) Addition Method

Why is prime factorization important? (Select all that apply)

Hint: Consider the applications of prime factorization in mathematics.

- ☐ A) It helps in simplifying fractions
- ☐ B) It is used in cryptography
- ☐ C) It helps in finding the square root of numbers
- ☐ D) It is used to identify even numbers

Describe how prime factorization can be used to find the greatest common divisor (GCD) of two numbers.

Hint: Think about how prime factors relate to common factors.

Part 3: Application and Analysis

What is the prime factorization of 84?

Hint: Break down 84 into its prime factors.

- ◯ A) 2 × 2 × 3 × 7
- ◯ B) 2 × 3 × 5 × 7
- ◯ C) 2 × 2 × 2 × 3
- ◯ D) 3 × 3 × 3 × 7

Using prime factorization, which of the following pairs of numbers have a GCD of 6? (Select all that apply)

Hint: Consider the prime factors of each pair.

- ☐ A) 18 and 24
- ☐ B) 12 and 30
- ☐ C) 14 and 28
- ☐ D) 6 and 18

Apply the prime factorization method to find the least common multiple (LC M) of 8 and 12. Show your work.

Hint: Consider the prime factors of both numbers and how they combine.

If the prime factorization of a number is $2^2 \times 3 \times 5$, what is the original number?

Hint: Multiply the prime factors together.

- ◯ A) 30
- ◯ B) 60
- ◯ C) 180
- ◯ D) 90

Part 4: Evaluation and Creation

Which of the following statements is true about the prime factorization of any even number?

Hint: Consider the properties of even numbers.

- ◯ A) It always includes the factor 2
- ◯ B) It always includes the factor 3
- ◯ C) It always includes the factor 5
- ◯ D) It always includes the factor 7

Evaluate the following statements and select those that are true regarding prime factorization. (Select all that apply)

Hint: Consider the properties and applications of prime factorization.

- ☐ A) Every composite number has a unique prime factorization
- ☐ B) Prime factorization can be used to simplify algebraic expressions
- ☐ C) Prime factorization is only applicable to even numbers
- ☐ D) Prime factorization helps in finding the LCM of two numbers

Create a real-world scenario where prime factorization could be used to solve a problem. Describe the scenario and how prime factorization would be applied.

Hint: Think about practical applications of prime factorization.