Prime and Composite Numbers, Prime Factorization, GCF, and LCM

- **Prime Number-** can be divided evenly only by 1, or itself. And it must be a whole **number** greater than 1.
  Example: 2 – 1, 2
- **Composite Number-** A whole **number** that can be divided evenly by **numbers** other than 1 or itself.
  Example: 15 – 1, 3, 5, 15
- **Factors-** numbers you can multiply together to get another number.
- 0 and 1 are neither prime or composite.

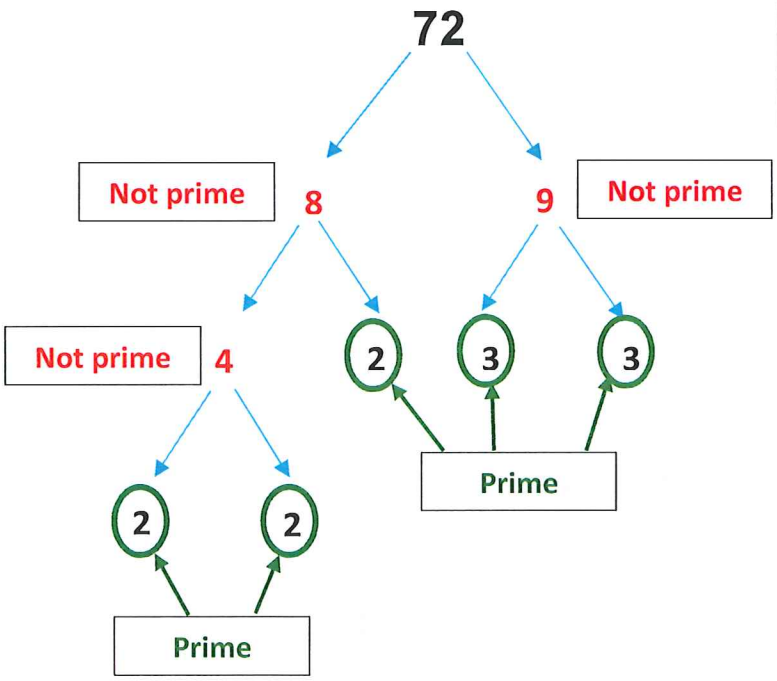
Prime Factorization

"Prime Factorization" is finding **which prime numbers** multiply together to make the original number.

Step 1: Take the number and find two numbers that can multiply together to get that number (factors).

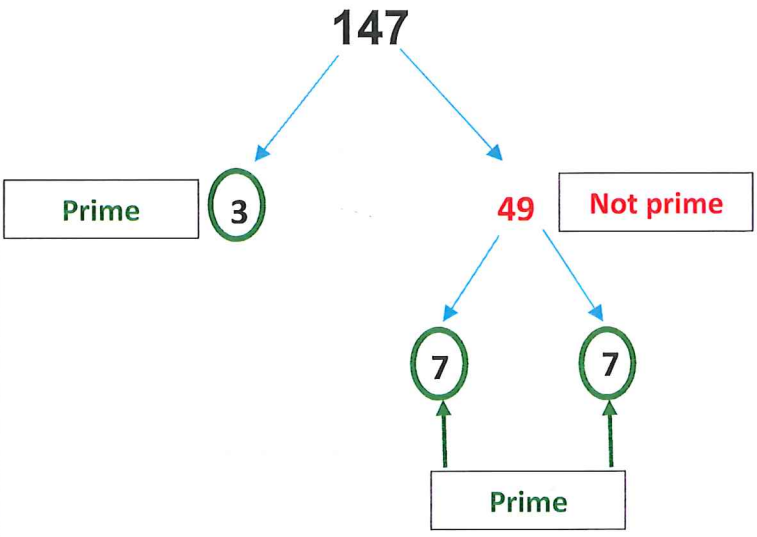
Step 2: Ask yourself is the number prime?
Step 3: If the number is prime, circle it. If the number is not prime, find new factors of that new number.
Step 4: Continue until all the numbers are prime.
Step 5: Take the prime numbers and write them starting with the smallest number and as many times as it appears.
Step 6: Rewrite using exponents if a number is repeated more than once.

Examples



$72 = 2 \times 2 \times 2 \times 3 \times 3$

$72 = 2^{3} \times 3^{2}$



$147 = 3 \times 7 \times 7$

$72 = 3 \times 7^{2}$

Greatest Common Factor (GCF)

- The **greatest common factor**, or **GCF**, is the **greatest factor** that divides two numbers.

Step 1: Find all the factors of each number.

Step 2: Circle the common factors.

Step 3: The greatest number of the numbers that are circled is the GCF.

Example

Find the GCF of 12 and 16

12 – 1, 2, 3, 4, 6, 12

16 – 1, 2, 4, 8, 16

Common factors of 12 and 16 are 1, 2, and 4

GCF of 12 and 16 is 4

Least Common Multiple (LCM)

- The smallest positive number that is a multiple of two or more numbers.
- We get a **multiple** of a number when we **multiply it by another number**. Such as multiplying by 1, 2, 3, 4, 5, etc., *but not zero*.
  Example: **4 x 1, 4 x 2, 4 x 3**, etc.

Step 1: Find the multiples of each number.

Step 2: Circle the smallest positive number that all the numbers have in common.

Example

Find the LCM of 6 and 15

6 – 6, 12, 18, 24, 30

15 – 15, 30, 45, 60

LCM of 6 and 15 is 30

Example

Find the LCM of 4, 6, and 8

4 – 4, 8, 12, 16, 20, 24, 28, 32

6 – 6, 12, 18, 24, 30, 36

8 – 8, 16, 24, 32, 40, 48

LCM of 4, 6, and 8 is 24