Prime and Composite numbers

Prime numbers are those numbers that have exactly two divisors. These two divisors are 1 and the number itself. A prime number cannot be written as the product of two factors, both greater than 1. In other words, primes are integers greater than one with no positive divisors besides one and itself. Prime numbers can never be negative. All other numbers, other than 1, are called Composite numbers.

Prime numbers: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 47, ...

Composite numbers: 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24, 25, 26, 27, 28, 30, ...

2 is the only even prime number. 2 is also the smallest prime number.

After 2 and 5, all following prime numbers end only in 1, 3, 7, and 9.

All prime numbers other than 2 and 3 can be written in the form 6m±1, where m is a positive integer other than zero.

All non-zero natural numbers can be factorized as products of two or more prime factors.

For example:

21 = 3 x 7

441 = 3 x 3 x 7 x 7

1578 = 2 x 3 x 263

If x is a positive integer greater than 1 there is always at least one prime number between x and 2x. For example, between 3 and 6, there is a prime number 5, and between 16 and 256, there are many prime numbers starting with 17, 19, and so on.

We can check whether a number is prime or not by testing it with all prime numbers less than the approximate square root of the number. For example to check if 247, we will test it with the prime numbers less than square root of 247. The closest square number is 256. Prime numbers less than 16 are thus tested. It is divisible by 13. So 247 is not a prime number. On the other hand, if we test 149. The square closest is 169, with square root 13. Testing with all prime numbers less than 13, we find that it is not divisible by any. So 149 is a prime number.

2, 3, 5, 7, 11, 13, ...

Process of doing Prime Factorization:

A) 363

1. Check whether the number is divisible by 2, then by 3, and then by 5, and so on by prime numbers increasing in value.
2. 363 is not divisible by 2, but is divisible by 3.
3. Now we have 121 left after division. It is divisible by 11.
4. We are left with 11.
5. Dividing it again by 11, we are left with 1.
6. So we have 363 fully factorized as
   363 = 3 x 11 x 11

3	363
	121

3	363
11	121
	11

3	363
11	121
11	11
	1

B) Similarly 392 = 2 x 2 x 2 x 7 x 7

C) And 720 = 2 x 2 x 2 x 2 x 3 x 3 x 5

2	630
3	315
3	105
5	35
7	7
	1

$630 = 2 \times 3 \times 3 \times 5 \times 7$

$= 2 \times 3^2 \times 5 \times 7$