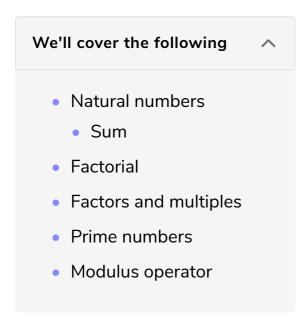
#### **Algebra**

I am going to assume that you are already aware of the topics in this lesson. However, I will go over them briefly to brush up and as a reference if and when you need them.



### Natural numbers #

All positive integers starting from  $11, 2, 3, 4, 5, 6, 7, 8, \dots$ 

#### Sum #

Sum of first n natural numbers is  $\frac{n*(n+1)}{2}$ 

### Factorial #

Denoted by the exclamation mark symbol.

n! is called n factorial and its value is defined as:

$$n! = 1 \times 2 \times 3 \times ... \times n$$

i.e., n! is the product of the first n natural numbers.

# Factors and multiples #

Factors: A factor of a number is a smaller or equal number such that it divides the

number exactly and gives the remainder zero. For example:

Factors of  $12 \rightarrow 1, 2, 3, 4, 6, 12$  **Multiples**: A multiple of a number, n, is a larger number such that the n is a factor of that number. For example:

Multiples of  $4 \rightarrow 4, 8, 12, 16, \dots$ 

## Prime numbers #

Prime numbers are natural numbers greater than 1 that cannot be expressed as a product of two smaller natural numbers.

They are natural numbers greater than 1 with only two factors, 1 and the number itself.

$$2, 3, 5, 7, 11, \dots$$

**Note**: A good estimation of the number of primes < N is logN. This is useful for complexity analysis.

# Modulus operator #

The modulus operation between two integers, a % b, returns the remainder when a is divided by b. For example:

5 % 2 = 1

100 % 89 = 11

2 % 5 = 2

9%3 = 0

21 % 21 = 0

The result of the modulus operator is 0 if a is a factor of b.

We can easily check if a number is even with if if (x % 2 == 0).

easy-medium problems that don't require computational geometry.