

# Mathematics 1 - Sequence and Series

Topics : [Computer engineering](#)

Written on [March 13, 2024](#)

## 1. Sequences:

- A sequence is an ordered list of numbers called terms. The terms follow a specific pattern or rule.
- Sequences can be finite (having a limited number of terms) or infinite (continuing indefinitely).

## 2. Arithmetic Sequence:

- In an arithmetic sequence, each term is found by adding or subtracting a common difference ( $d$ ) to the previous term.
- The  $n$ th term of an arithmetic sequence can be represented as:  $a_n = a_1 + (n-1)d$ , where  $a_1$  is the first term.

## 3. Geometric Sequence:

- In a geometric sequence, each term is found by multiplying or dividing the previous term by a common ratio ( $r$ ).
- The  $n$ th term of a geometric sequence can be represented as:  $a_n = a_1 \times r^{(n-1)}$ , where  $a_1$  is the first term.

## 4. Series:

- A series is the sum of the terms of a sequence. It can be finite or infinite.
- The sum of the first  $n$  terms of a sequence is called an  $n$ -th partial sum.

## 5. Arithmetic Series:

- An arithmetic series is the sum of the terms of an arithmetic sequence.
- The sum of the first  $n$  terms of an arithmetic series ( $S_n$ ) can be calculated using the formula:  $S_n = n/2(a_1 + a_n)$ .

## 6. Geometric Series:

- A geometric series is the sum of the terms of a geometric sequence.
- The sum of the first  $n$  terms of a geometric series ( $S_n$ ) can be calculated using the formula:  $S_n = a_1(1 - r^n)/(1 - r)$ , where  $r$  is the common ratio.

## 7. Convergence and Divergence:

- A series converges if the sum of its terms approaches a finite value as the number of terms increases.
- A series diverges if the sum of its terms does not approach a finite value as the number of terms increases.

© Copyright **Aryatechno**. All Rights Reserved. Written tutorials and materials by [Aryatechno](#)

ARYATECHNO