

Mathematics 1 - Sequence and Series

Topics : [Computer engineering](#)

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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.

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