

Sequences and Series — Assignment 1

Class 11 Maths · Topic-wise question bank covering every concept of the chapter · Narayan Gurukul Academy

Instructions: (1) Attempt all questions. This worksheet walks through every concept of the chapter, topic by topic.
(2) The interactive MCQ version of these questions (with instant answer reveal) is available on the notes page.
(3) Universal values: $g = 10 \text{ m/s}^2$ unless stated. Give answers with correct SI units.

Sequences and Series — Basics

MCQ Questions (choose the correct option)

1. A sequence is a function whose domain is
 - (A) the set of natural numbers
 - (B) the set of real numbers
 - (C) the set of integers
 - (D) the set of rationals
2. The sum of the terms of a sequence is called a
 - (A) series
 - (B) progression
 - (C) difference
 - (D) ratio
3. A sequence having a finite number of terms is called
 - (A) a finite sequence
 - (B) an infinite sequence
 - (C) a series
 - (D) a progression
4. The n th term of a sequence is denoted by
 - (A) a_n
 - (B) S_n
 - (C) d
 - (D) r

1 Mark Questions

1. Define a sequence.
2. What is a series?
3. Write the n th term of the sequence 2, 4, 6, 8, ...

2 Mark Questions

1. Write the first four terms of the sequence $a_n = 2n + 1$.
2. Find the sum of the first three terms of the sequence $a_n = n^2$.

3 Mark Questions

1. Find the first five terms of the sequence defined by $a_n = (-1)^n 2^n$.
2. Find the n th term of the sequence $1/2, 2/3, 3/4, 4/5, \dots$

Arithmetic Progression (AP)

MCQ Questions (choose the correct option)

- The n th term of an AP with first term a and common difference d is
 - $a + (n - 1)d$
 - $a + nd$
 - $a - (n - 1)d$
 - $an + d$
- The sum of the first n terms of an AP is
 - $n/2[2a + (n - 1)d]$
 - na
 - $n(a + d)$
 - $a + nd$
- The common difference of the AP 3, 7, 11, 15, ... is
 - 4
 - 3
 - 7
 - 11
- The 10th term of the AP 2, 5, 8, ... is
 - 29
 - 32
 - 26
 - 23

1 Mark Questions

- Write the formula for the n th term of an AP.
- Find the common difference of 3, 7, 11, 15, ...
- Write the formula for the sum of the first n terms of an AP.

2 Mark Questions

- Find the 10th term of the AP 2, 5, 8, ...
- Find the sum of the first 20 terms of the AP 1, 3, 5, ...

3 Mark Questions

- The 5th term of an AP is 19 and the 12th term is 40. Find the AP and its 20th term.
- Find the sum of all natural numbers between 100 and 500 which are divisible by 7.

Geometric Progression (GP)

MCQ Questions (choose the correct option)

- The n th term of a GP with first term a and common ratio r is
 - $ar^{(n-1)}$
 - $a + (n-1)r$
 - ar^n
 - a/r^n
- The sum of the first n terms of a GP ($r \neq 1$) is

- (A) $a(r^n - 1)/(r - 1)$
 (B) $n/2[2a + (n-1)d]$
 (C) ar^n
 (D) $a/(1 - r)$
3. The common ratio of the GP 2, 6, 18, 54, ... is
 (A) 3
 (B) 2
 (C) 6
 (D) 4
4. The sum to infinity of a GP with $|r| < 1$ is
 (A) $a/(1 - r)$
 (B) $a(r^n - 1)/(r - 1)$
 (C) ar^n
 (D) $a/(1 + r)$

1 Mark Questions

- Write the formula for the n th term of a GP.
- Find the common ratio of 2, 6, 18, 54, ...
- Write the formula for the sum to infinity of a GP.

2 Mark Questions

- Find the 6th term of the GP 3, 6, 12, ...
- Find the sum of the first 5 terms of the GP 1, 2, 4, ...

3 Mark Questions

- The 3rd term of a GP is 24 and the 6th term is 192. Find the GP and its 8th term.
- Find the sum to infinity of the GP $1 + 1/2 + 1/4 + 1/8 + \dots$

Arithmetic Mean and Geometric Mean

MCQ Questions (choose the correct option)

- The arithmetic mean of two numbers a and b is
 (A) $(a + b)/2$
 (B) $\sqrt{ab}$
 (C) $ab/2$
 (D) $a + b$
- The geometric mean of two positive numbers a and b is
 (A) $\sqrt{ab}$
 (B) $(a + b)/2$
 (C) ab
 (D) a/b
- For two positive numbers, AM and GM satisfy
 (A) $AM \geq GM$
 (B) $AM \leq GM$
 (C) $AM = GM$ always

- (D) $AM < GM$ always
4. The geometric mean of 4 and 9 is
- (A) 6
- (B) 6.5
- (C) 5
- (D) 13

1 Mark Questions

- Write the formula for the arithmetic mean of a and b.
- Write the formula for the geometric mean of a and b.
- State the relation between AM and GM.

2 Mark Questions

- Find the AM and GM of 4 and 9.
- Insert two arithmetic means between 3 and 15.

3 Mark Questions

- Prove that $AM \geq GM$ for two positive numbers a and b.
- Insert three geometric means between 2 and 162.

Sum of Special Series

MCQ Questions (choose the correct option)

- The sum of the first n natural numbers is

(A) $n(n + 1)/2$

(B) n^2

(C) $n(n - 1)/2$

(D) $n(n + 1)(2n + 1)/6$
- The sum of the squares of the first n natural numbers is

(A) $n(n + 1)(2n + 1)/6$

(B) $n(n + 1)/2$

(C) $[n(n + 1)/2]^2$

(D) n^2
- The sum of the cubes of the first n natural numbers is

(A) $[n(n + 1)/2]^2$

(B) $n(n + 1)(2n + 1)/6$

(C) $n(n + 1)/2$

(D) n^3
- The value of $1 + 2 + 3 + \dots + 100$ is

(A) 5050

(B) 5000

(C) 10100

(D) 4950

1 Mark Questions

1. Write the formula for the sum of the first n natural numbers.
2. Write the formula for the sum of the squares of the first n natural numbers.
3. Find $1 + 2 + 3 + \dots + 50$.

2 Mark Questions

1. Find the sum of the first 10 natural numbers.
2. Find the sum of the squares of the first 10 natural numbers.

3 Mark Questions

1. Find the sum of the series $1^2 + 2^2 + 3^2 + \dots + 20^2$.
2. Find the sum of the first n terms of the series $1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \dots$

Properties of AP and GP

MCQ Questions (choose the correct option)

1. If a constant is added to each term of an AP, the resulting sequence is
 - (A) an AP with the same common difference
 - (B) a GP
 - (C) neither AP nor GP
 - (D) a constant sequence
2. If each term of a GP is multiplied by a non-zero constant, the new sequence is
 - (A) a GP with the same common ratio
 - (B) an AP
 - (C) a constant sequence
 - (D) neither
3. If a, b, c are in AP, then
 - (A) $2b = a + c$
 - (B) $b^2 = ac$
 - (C) $b = ac$
 - (D) $a + b + c = 0$
4. If a, b, c are in GP, then
 - (A) $b^2 = ac$
 - (B) $2b = a + c$
 - (C) $b = a + c$
 - (D) $a = bc$

1 Mark Questions

1. If a, b, c are in AP, write the relation between them.
2. If a, b, c are in GP, write the relation between them.
3. A constant is added to each term of an AP. What is the new sequence?

2 Mark Questions

1. If 2, x , 8 are in AP, find x .
2. If 2, x , 8 are in GP, find x .

3 Mark Questions

1. If a, b, c are in AP, prove that $(a + 2b - c)(2b + c - a) = 4abc$. (Use the AP relation.)
2. Show that if each term of a GP is multiplied by a non-zero constant, the result is still a GP with the same common ratio.