

Sum of n Terms of an AP

Chapter 5: Arithmetic Progressions · Topic 2

Key Concept

For example, the sum of the first 10 terms of the AP 1,3,5,7... ($a=1$, $d=2$) is $S_{10} = 10/2 \times [2(1)+(10-1)(2)] = 5 \times [2+18] = 5 \times 20 = 100$. This formula is derived by pairing the first and last terms, second and second-to-last terms, and so on — each pair sums to the same total, a clever technique historically attributed to the young mathematician Carl Friedrich Gauss. This formula has practical applications in finance (calculating total savings over time) and physics (calculating total distance under constant acceleration).

Quick Revision Notes

- Sum of n terms of an AP: $S_n = n/2 \times [2a + (n-1)d]$.
- Example: sum of first 10 terms of 1,3,5,7... is $5 \times [2+18]=100$.
- This formula is derived by pairing terms from opposite ends of the sequence.
- Applications include finance (savings over time) and physics (distance under acceleration).

Practice Questions

- 1 Find the sum of the first 10 terms of the AP 1,3,5,7...
- 2 Find the sum of the first 20 terms of an AP with first term 4 and common difference 3.
- 3 Explain the pairing technique used to derive the AP sum formula.