

Arithmetic Progressions

CBSE Class 10 Maths · Knowledge organiser

KEY DEFINITIONS

Arithmetic progression (AP)

A list of numbers where each term is the previous term plus a fixed number d .

Common difference

$d = a_{n+1} - a_n$, the same all the way along an AP.

n th term

$a_n = a + (n - 1)d$ gives any term from its position.

KEY FORMULAS

n th term	$a_n = a + (n - 1)d$
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Sum of first n terms	$S_n = \frac{n}{2} [2a + (n - 1)d] = \frac{n}{2} (a + l)$
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From S_n	$a_n = S_n - S_{n-1}$
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n th term from the end (last term l)	$l - (n - 1)d$
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Three terms in AP; middle term	$a - d, a, a + d; \quad b = \frac{a+c}{2}$
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Natural numbers	$1 + 2 + \dots + n = \frac{n(n+1)}{2}$
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YOU SHOULD BE ABLE TO...

- Spot an AP, find its common difference and any term, and count how many terms a list has.
- Use S_n confidently, find a term from the end and solve the standard board questions on sums of multiples.
- Write complete 5-mark answers on AP word problems (savings, instalments, rows of seats) with a , d and n stated.
- Handle S_n given as a formula, 'three numbers in AP' and sums of the next n terms, the 95+ questions.

WORKED EXAMPLE

Which term of 5, 9, 13, ... is 101?

$$5 + 4(n - 1) = 101 \Rightarrow n = 25.$$

COMMON MISTAKES

- ✗ Using $a + nd$ instead of $a + (n - 1)d$.
- ✗ Finding the number of terms as $\frac{l - a}{d}$ and forgetting the "+1".
- ✗ Confusing a_n (one term) with S_n (a sum).
- ✗ Rejecting a second valid value of n when both give the same sum (negative terms can cancel).