

# NCERT Solutions for Class 10 Maths Chapter 5 Arithmetic Progressions | Updated 2026-27

## ✂ Quick Revision Box — Arithmetic Progressions Chapter 5

- **AP Definition:** A sequence where each term is obtained by adding a fixed number (common difference  $d$ ) to the previous term.
- **General form:**  $a, a+d, a+2d, a+3d, \dots$
- **Common difference:**  $d = a_2 - a_1 = a_3 - a_2$  (must be constant throughout)
- **nth term formula:**  $a_n = a + (n-1)d$
- **Sum of n terms:**  $S_n = n/2[2a + (n-1)d]$  or  $S_n = n/2(a + l)$
- **Compound interest  $\neq$  AP** — it forms a GP because the ratio, not the difference, is constant.
- **Vacuum pump air removal  $\neq$  AP** — each step removes a fraction of remaining air, so differences are not equal.
- **Exercise 5.1 focus:** Identifying APs, writing terms from given  $a$  and  $d$ , finding  $a$  and  $d$  from a given AP.

 **Updated for 2026-27 Rationalised Syllabus:** This page reflects the latest NCERT syllabus for 2026-27. Any exercises removed from the current syllabus are clearly labelled "Extra Reference / State Boards" and are not required for CBSE board exams.  
ncert solutions for class 10 maths chapter 5 arithmetic progressions — ncertbooks.net

These **NCERT solutions for class 10 maths chapter 5 arithmetic progressions** cover every question in Exercise 5.1 with complete step-by-step working, updated for the **2026-27 CBSE board exam**. Whether you are checking your homework, preparing for unit tests, or revising for boards, this page gives you accurate, exam-ready answers. You can find all [NCERT Solutions for Class 10](#) on our hub page, and the full collection of [NCERT Solutions](#) for all classes is also available. The official textbook is published by [NCERT \(National Council of Educational Research and Training\)](#).

## Table of Contents

1. [Quick Revision Box](#)
2. [Chapter Overview — Arithmetic Progressions Class 10](#)
3. [Key Concepts and Theorems](#)
4. [NCERT Solutions for Class 10 Maths Chapter 5 Exercise 5.1 — All Questions](#)
5. [Formula Reference Table](#)
6. [Solved Examples Beyond NCERT](#)
7. [Important Questions for CBSE Board Exam](#)
8. [Common Mistakes Students Make](#)

9. [Exam Tips for 2026-27 CBSE Board](#)
10. [Frequently Asked Questions](#)

## Chapter Overview — Arithmetic Progressions Class 10 Maths (CBSE 2026-27)

Chapter 5 of the NCERT Class 10 Maths textbook, *Arithmetic Progressions*, introduces one of the most important number patterns in mathematics. An **arithmetic progression (AP)** is a sequence of numbers where each term after the first is obtained by adding a fixed value called the **common difference** ( $d$ ). This chapter builds directly on your understanding of number patterns from earlier classes.

For the CBSE 2026-27 board exam, this chapter carries significant weightage under the **Algebra** unit. Questions from this chapter appear in 1-mark (MCQ), 2-mark, 3-mark, and 5-mark sections. Exercise 5.1 specifically tests your ability to identify whether a given sequence is an AP, write terms of an AP when  $a$  and  $d$  are given, and extract  $a$  and  $d$  from a given AP.

Before studying this chapter, you should be comfortable with **number sequences, linear equations, and basic algebraic expressions** from Class 9. The chapter has four exercises: Ex 5.1 (basics), Ex 5.2 (nth term), Ex 5.3 (sum of  $n$  terms), and Ex 5.4 (optional). This page covers **Exercise 5.1** completely.

Detail	Information
Chapter	5 — Arithmetic Progressions
Textbook	NCERT Mathematics — Class 10
Exercise	Exercise 5.1 (Page 99)
Number of Questions	4 Questions (with multiple sub-parts)
CBSE Unit	Algebra
Difficulty Level	Easy to Medium
Academic Year	2026-27

## Key Concepts and Theorems — Arithmetic Progressions

### What is an Arithmetic Progression?

An **arithmetic progression** (समान्तर श्रेणी) is a list of numbers in which each term is obtained by adding a fixed number to the preceding term. The fixed number is the **common difference** ( $d$ ). It can be positive, negative, or zero. For example: 2, 5, 8, 11, ... is an AP with  $a = 2$  and  $d = 3$ .

## General Form of an AP

Any AP can be written as:

$$a, a+d, a+2d, a+3d, \dots$$

where  $a$  is the **first term** and  $d$  is the **common difference**. A **finite AP** has a last term; an **infinite AP** continues forever.

## How to Check if a Sequence is an AP

Calculate the difference between consecutive terms:  $a_2 - a_1$ ,  $a_3 - a_2$ ,  $a_4 - a_3$ , and so on. If **all differences are equal**, the sequence is an AP. This equal value is the common difference  $d$ . If even one difference is different, the sequence is **not an AP**.

## $n$ th Term Formula

The  $n$ th term (general term) of an AP with first term  $a$  and common difference  $d$  is:

$$a_n = a + (n-1)d$$

This formula is essential for solving most board exam questions in this chapter.

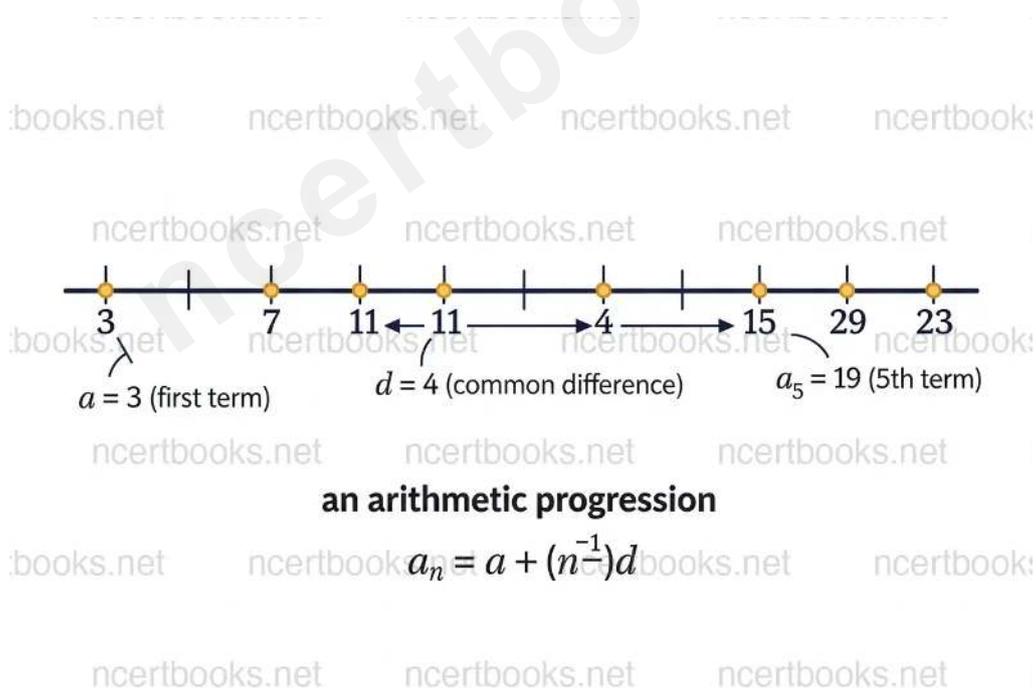


Fig 5.1: AP terms on a number line — equal spacing shows constant common difference

## NCERT Solutions for Class 10 Maths Chapter 5 Arithmetic Progressions — Exercise 5.1

Below are complete, step-by-step solutions to all four questions in Exercise 5.1 of the NCERT Class 10 Maths textbook. These solutions match the official NCERT answer key and are updated for the 2026-27 CBSE syllabus.

### Question 1

Medium

In which of the following situations, does the list of numbers involved make an arithmetic progression and why?

- (i) The taxi fare after each km when the fare is ₹ 15 for the first km and ₹ 8 for each additional km.
- (ii) The amount of air present in a cylinder when a vacuum pump removes  $\frac{1}{4}$  of the air remaining in the cylinder at a time.
- (iii) The cost of digging a well after every meter of digging, when it costs ₹ 150 for the first meter and rises by ₹ 50 for each subsequent meter.
- (iv) The amount of money in the account every year, when ₹ 10000 is deposited at compound interest at 8% per annum.

#### (i) Taxi fare situation

**Step 1:** List the fare after each km.

After 1st km: ₹ 15

After 2nd km: ₹ 15 + ₹ 8 = ₹ 23

After 3rd km: ₹ 23 + ₹ 8 = ₹ 31

After 4th km: ₹ 31 + ₹ 8 = ₹ 39

**Step 2:** Check the differences.

$$23 - 15 = 8, 31 - 23 = 8, 39 - 31 = 8$$

*Why does this work?* Each km adds a constant ₹ 8 to the previous fare, so the difference is always the same.

∴ **Yes, this is an AP.** First term  $a = 15$ , common difference  $d = 8$ .

#### (ii) Vacuum pump removing air

**Step 1:** Let the initial amount of air be  $x$  units.

After 1st removal:  $x - x/4 = 3x/4$

After 2nd removal:  $3x/4 - 1/4 \cdot 3x/4 = 3x/4 \times 3/4 = 9x/16$

After 3rd removal:  $9x/16 \times 3/4 = 27x/64$

**Step 2:** Check the differences.

$$9x/16 - 3x/4 = (9x - 12x)/(16) = -3x/16$$

$$27x/64 - 9x/16 = (27x - 36x)/(64) = -9x/64$$

*Why does this work?* The pump removes  $1/4$  of the *remaining* air each time, not a fixed amount. So the differences are  $-3x/16$  and  $-9x/64$ , which are not equal.

$\therefore$  **No, this is NOT an AP.** The differences between consecutive terms are not constant.

### (iii) Cost of digging a well

**Step 1:** List the cumulative cost after each meter.

After 1st meter: ₹ 150

After 2nd meter: ₹ 150 + ₹ 200 = ₹ 350

After 3rd meter: ₹ 350 + ₹ 250 = ₹ 600

After 4th meter: ₹ 600 + ₹ 300 = ₹ 900

**Step 2:** Check the differences.

$$350 - 150 = 200, 600 - 350 = 250, 900 - 600 = 300$$

*Why does this work?* The cost for each successive meter increases by ₹ 50 (150, 200, 250, 300, ...), so the individual costs form an AP with  $a = 150$  and  $d = 50$ . The cumulative costs (150, 350, 600, 900) do NOT form an AP since their differences (200, 250, 300) are not constant.

$\therefore$  **Yes, the cost per meter forms an AP** with  $a = 150$  and  $d = 50$ . The sequence is: 150, 200, 250, 300, ...

### (iv) Compound interest amount

**Step 1:** Calculate the amount at the end of each year using compound interest formula  $A = P(1 + r)^n$  with  $P = 10000$ ,  $r = 0.08$ .

After Year 1:  $10000 \times 1.08 = ₹ 10800$

After Year 2:  $10000 \times (1.08)^2 = ₹ 11664$

After Year 3:  $10000 \times (1.08)^3 = ₹\ 12597.12$

**Step 2:** Check the differences.

$$11664 - 10800 = 864$$

$$12597.12 - 11664 = 933.12$$

*Why does this work?* In compound interest, interest is earned on the growing amount each year, not on the original principal alone. So the amount increases by a fixed *ratio* (1.08), not a fixed *difference*. This makes it a geometric progression, not an AP.

**∴ No, this is NOT an AP.** The differences between consecutive amounts are not constant. Compound interest forms a geometric progression (GP).

**Board Exam Note:** This type of question typically appears in 2-3 mark sections of CBSE board papers. You must state the differences between terms clearly and give a reason for your answer.

## Question 2

Easy

Write first four terms of the AP, when the first term  $a$  and the common difference  $d$  are given as follows:

(i)  $a = 10, d = 10$

(ii)  $a = -2, d = 0$

(iii)  $a = 4, d = -3$

(iv)  $a = -1, d = 1/2$

(v)  $a = -1.25, d = -0.25$

**Key Concept:** To write the first four terms of an AP, use  $a_1 = a$ ,  $a_2 = a + d$ ,  $a_3 = a + 2d$ ,  $a_4 = a + 3d$ .

**(i)  $a = 10, d = 10$**

$$a_1 = 10$$

$$a_2 = 10 + 10 = 20$$

$$a_3 = 10 + 2(10) = 30$$

$$a_4 = 10 + 3(10) = 40$$

**∴ First four terms: 10, 20, 30, 40**

**(ii)  $a = -2, d = 0$**

$$a_1 = -2$$

$$a_2 = -2 + 0 = -2$$

$$a_3 = -2 + 2(0) = -2$$

$$a_4 = -2 + 3(0) = -2$$

*Why does this work?* When  $d = 0$ , all terms are equal. This is called a **constant AP**.

**∴ First four terms: -2, -2, -2, -2**

**(iii)  $a = 4, d = -3$**

$$a_1 = 4$$

$$a_2 = 4 + (-3) = 1$$

$$a_3 = 4 + 2(-3) = -2$$

$$a_4 = 4 + 3(-3) = -5$$

*Why does this work?* A negative common difference means the AP is **decreasing**.

**∴ First four terms: 4, 1, -2, -5**

**(iv)  $a = -1, d = 1/2$**

$$a_1 = -1$$

$$a_2 = -1 + 1/2 = -1/2$$

$$a_3 = -1 + 2 \times 1/2 = 0$$

$$a_4 = -1 + 3 \times 1/2 = 1/2$$

**∴ First four terms: -1, -1/2, 0, 1/2**

**(v)  $a = -1.25, d = -0.25$**

$$a_1 = -1.25$$

$$a_2 = -1.25 + (-0.25) = -1.50$$

$$a_3 = -1.25 + 2(-0.25) = -1.75$$

$$a_4 = -1.25 + 3(-0.25) = -2.00$$

**∴ First four terms: -1.25, -1.50, -1.75, -2.00**

**Board Exam Note:** This type of question typically appears in 2-3 mark sections of CBSE board papers. Show each term's calculation clearly using the AP formula.

### Question 3

Easy

For the following APs, write the first term and the common difference:

(i) 3, 1, -1, -3, ...

(ii) -5, -1, 3, 7, ...

(iii)  $\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{13}{3}, \dots$

(iv) 0.6, 1.7, 2.8, 3.9, ...

**Key Concept:** The first term  $a = a_1$  (the first number in the list). The common difference  $d = a_2 - a_1$ .

(i) 3, 1, -1, -3, ...

$$a = 3$$

$$d = a_2 - a_1 = 1 - 3 = -2$$

**Verification:**  $-1 - 1 = -2$  and  $-3 - (-1) = -2$ . ✓

∴ **First term  $a = 3$ , Common difference  $d = -2$**

(ii) -5, -1, 3, 7, ...

$$a = -5$$

$$d = a_2 - a_1 = -1 - (-5) = 4$$

**Verification:**  $3 - (-1) = 4$  and  $7 - 3 = 4$ . ✓

∴ **First term  $a = -5$ , Common difference  $d = 4$**

(iii)  $\frac{1}{3}, \frac{5}{3}, \frac{9}{3}, \frac{13}{3}, \dots$

$$a = \frac{1}{3}$$

$$d = \frac{5}{3} - \frac{1}{3} = \frac{4}{3}$$

**Verification:**  $\frac{9}{3} - \frac{5}{3} = \frac{4}{3}$  and  $\frac{13}{3} - \frac{9}{3} = \frac{4}{3}$ . ✓

∴ **First term  $a = \frac{1}{3}$ , Common difference  $d = \frac{4}{3}$**

(iv) 0.6, 1.7, 2.8, 3.9, ...

$$a = 0.6$$

$$d = 1.7 - 0.6 = 1.1$$

**Verification:**  $2.8 - 1.7 = 1.1$  and  $3.9 - 2.8 = 1.1$ . ✓

∴ **First term a = 0.6, Common difference d = 1.1**

**Board Exam Note:** This type of question typically appears in 1-2 mark sections of CBSE board papers. Always verify your common difference using at least two pairs of consecutive terms.

#### Question 4

Medium

Which of the following are APs? If they form an AP, find the common difference d and write three more terms.

(i) 2, 4, 8, 16, ...

(ii)  $2, \sqrt{5/2}, 3, \sqrt{7/2}, \dots$

(iii) -1.2, -3.2, -5.2, -7.2, ...

(iv) -10, -6, -2, 2, ...

(v)  $3, 3+\sqrt{2}, 3+2\sqrt{2}, 3+3\sqrt{2}, \dots$

(vi) 0.2, 0.22, 0.222, 0.2222, ...

(vii) 0, -4, -8, -12, ...

(viii)  $-1/2, -1/2, -1/2, -1/2, \dots$

(ix) 1, 3, 9, 27, ...

(x) a, 2a, 3a, 4a, ...

(xi) a, a<sup>2</sup>, a<sup>3</sup>, a<sup>4</sup>, ...

(xii)  $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$

(xiii)  $\sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12}, \dots$

(xiv) 1<sup>2</sup>, 3<sup>2</sup>, 5<sup>2</sup>, 7<sup>2</sup>, ...

(xv) 1<sup>2</sup>, 5<sup>2</sup>, 7<sup>2</sup>, 7<sup>3</sup>, ...

**(i) 2, 4, 8, 16, ...**

$$4 - 2 = 2, 8 - 4 = 4, 16 - 8 = 8$$

Differences are 2, 4, 8 — not equal.

∴ **Not an AP.**

**(ii)  $2, \sqrt{5/2}, 3, \sqrt{7/2}, \dots$**

$$5/2 - 2 = 1/2, 3 - 5/2 = 1/2, 7/2 - 3 = 1/2$$

All differences equal 1/2. This is an AP with d = 1/2.

Next three terms:

$$a_5 = 7/2 + 1/2 = 4, a_6 = 4 + 1/2 = 9/2, a_7 = 9/2 + 1/2 = 5$$

∴ AP with  $d = 1/2$ . Next three terms: 4, 9/2, 5

(iii) -1.2, -3.2, -5.2, -7.2, ...

$$-3.2 - (-1.2) = -2, -5.2 - (-3.2) = -2, -7.2 - (-5.2) = -2$$

All differences equal -2. This is an AP with  $d = -2$ .

$$a_5 = -7.2 + (-2) = -9.2, a_6 = -11.2, a_7 = -13.2$$

∴ AP with  $d = -2$ . Next three terms: -9.2, -11.2, -13.2

(iv) -10, -6, -2, 2, ...

$$-6 - (-10) = 4, -2 - (-6) = 4, 2 - (-2) = 4$$

All differences equal 4. This is an AP with  $d = 4$ .

$$a_5 = 2 + 4 = 6, a_6 = 10, a_7 = 14$$

∴ AP with  $d = 4$ . Next three terms: 6, 10, 14

(v) 3,  $3+\sqrt{2}$ ,  $3+2\sqrt{2}$ ,  $3+3\sqrt{2}$ , ...

$$(3+\sqrt{2}) - 3 = \sqrt{2}, (3+2\sqrt{2}) - (3+\sqrt{2}) = \sqrt{2}, (3+3\sqrt{2}) - (3+2\sqrt{2}) = \sqrt{2}$$

All differences equal  $\sqrt{2}$ . This is an AP.

$$a_5 = 3+4\sqrt{2}, a_6 = 3+5\sqrt{2}, a_7 = 3+6\sqrt{2}$$

∴ AP with  $d = \sqrt{2}$ . Next three terms:  $3+4\sqrt{2}$ ,  $3+5\sqrt{2}$ ,  $3+6\sqrt{2}$

(vi) 0.2, 0.22, 0.222, 0.2222, ...

$$0.22 - 0.2 = 0.02, 0.222 - 0.22 = 0.002, 0.2222 - 0.222 = 0.0002$$

Differences are 0.02, 0.002, 0.0002 — not equal.

∴ Not an AP.

(vii) 0, -4, -8, -12, ...

$$-4 - 0 = -4, -8 - (-4) = -4, -12 - (-8) = -4$$

All differences equal -4. This is an AP.

$$a_5 = -12 + (-4) = -16, a_6 = -20, a_7 = -24$$

∴ AP with  $d = -4$ . Next three terms: -16, -20, -24

(viii) -1/2, -1/2, -1/2, -1/2, ...

$$-1/2 - (-1/2) = 0, \text{ same for all pairs}$$

All differences equal 0. This is a constant AP.

$$a_5 = -1/2, a_6 = -1/2, a_7 = -1/2$$

**∴ AP with  $d = 0$ . Next three terms:  $-1/2, -1/2, -1/2$**

**(ix) 1, 3, 9, 27, ...**

$$3 - 1 = 2, 9 - 3 = 6, 27 - 9 = 18$$

Differences are 2, 6, 18 — not equal. (This is a geometric progression with ratio 3.)

**∴ Not an AP.**

**(x)  $a, 2a, 3a, 4a, \dots$**

$$2a - a = a, 3a - 2a = a, 4a - 3a = a$$

All differences equal  $a$ . This is an AP (as long as  $a$  is a fixed number).

$$a_5 = 5a, a_6 = 6a, a_7 = 7a$$

**∴ AP with  $d = a$ . Next three terms:  $5a, 6a, 7a$**

**(xi)  $a, a^2, a^3, a^4, \dots$**

$$a^2 - a = a(a-1), a^3 - a^2 = a^2(a-1), a^4 - a^3 = a^3(a-1)$$

These differences are  $a(a-1), a^2(a-1), a^3(a-1)$  — not equal (unless  $a = 0$  or  $a = 1$ ).

**∴ Not an AP** (in general, for  $a \neq 0$  and  $a \neq 1$ ).

**(xii)  $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$**

**Step 1:** Simplify each term.

$$\sqrt{2} = \sqrt{2}, \sqrt{8} = 2\sqrt{2}, \sqrt{18} = 3\sqrt{2}, \sqrt{32} = 4\sqrt{2}$$

**Step 2:** Check differences.

$$2\sqrt{2} - \sqrt{2} = \sqrt{2}, 3\sqrt{2} - 2\sqrt{2} = \sqrt{2}, 4\sqrt{2} - 3\sqrt{2} = \sqrt{2}$$

$$a_5 = 5\sqrt{2} = \sqrt{50}, a_6 = 6\sqrt{2} = \sqrt{72}, a_7 = 7\sqrt{2} = \sqrt{98}$$

**∴ AP with  $d = \sqrt{2}$ . Next three terms:  $\sqrt{50}, \sqrt{72}, \sqrt{98}$**

**(xiii)  $\sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12}, \dots$**

$$\sqrt{6} - \sqrt{3} = \sqrt{3}(\sqrt{2}-1) \approx 0.732$$

$$\sqrt{9} - \sqrt{6} = 3 - \sqrt{6} \approx 0.551$$

These differences are not equal.

∴ **Not an AP.** The differences between consecutive terms are not constant.

(xiv)  $1^2, 3^2, 5^2, 7^2, \dots$  i.e., **1, 9, 25, 49, ...**

$$9 - 1 = 8, 25 - 9 = 16, 49 - 25 = 24$$

Differences are 8, 16, 24 — not equal (they increase by 8 each time).

∴ **Not an AP.**

(xv)  $1^2, 5^2, 7^2, 7^3, \dots$  i.e., **1, 25, 49, 343, ...**

$$25 - 1 = 24, 49 - 25 = 24, 343 - 49 = 294$$

The first two differences are 24, but the third is 294 — not equal.

∴ **Not an AP.** The differences are not constant throughout.

**Board Exam Note:** Question 4 is a high-value question in 2-3 mark sections of CBSE board papers. For each part, always show the differences between at least three pairs of consecutive terms before concluding.

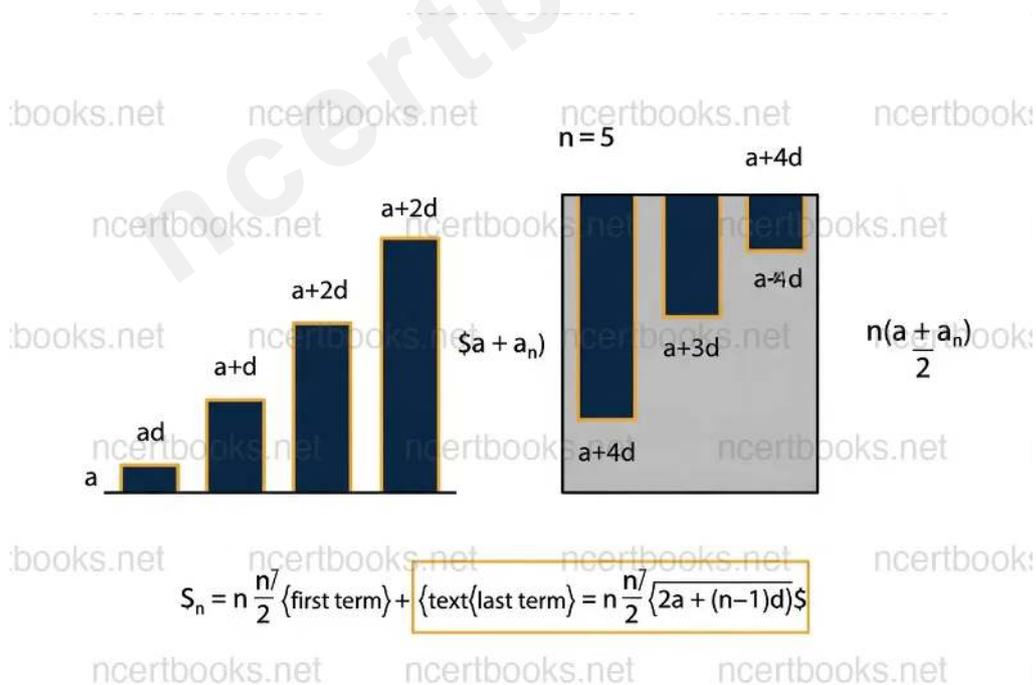


Fig 5.2: Visual derivation of  $S_n = \frac{n}{2} \times (2a + (n-1)d)$

## Formula Reference Table — Arithmetic Progressions Class 10

Formula Name	Formula	Variables Defined
General term (nth term)	$a_n = a + (n-1)d$	$a$ = first term, $d$ = common difference, $n$ = term number
Common difference	$d = a_{k+1} - a_k$	Any two consecutive terms
Sum of first $n$ terms	$S_n = n/2[2a + (n-1)d]$	$a$ = first term, $d$ = common difference
Sum using last term	$S_n = n/2(a + l)$	$l$ = last term
Arithmetic mean	$b = a+c/2$	$a, b, c$ are in AP
Sum of first $n$ natural numbers	$S = (n(n+1))/(2)$	$n$ = number of terms

You can also explore related solutions on our [NCERT Solutions Class 10](#) hub page for all chapters.

## Solved Examples Beyond NCERT — Arithmetic Progressions

### Extra Example 1 — Find the 20th term of an AP

Easy

Find the 20th term of the AP: 3, 7, 11, 15, ...

**Step 1:** Identify  $a = 3$  and  $d = 7 - 3 = 4$ .

**Step 2:** Apply the  $n$ th term formula with  $n = 20$ .

$$a_{20} = a + (20-1)d = 3 + 19 \times 4 = 3 + 76 = 79$$

**∴ The 20th term is 79.**

### Extra Example 2 — Check if 301 is a term of the AP

Medium

Is 301 a term of the AP: 5, 11, 17, 23, ...?

**Step 1:**  $a = 5, d = 6$ .

**Step 2:** Set  $a_n = 301$  and solve for  $n$ .

$$5 + (n-1) \times 6 = 301$$

$$(n-1) \times 6 = 296$$

$$n - 1 = 296/6 = 49.33\dots$$

Since  $n$  is not a natural number, 301 is not a term of this AP.

**$\therefore$  301 is NOT a term of this AP.**

**Extra Example 3 — How many terms of the AP: 9, 17, 25, ... must be taken to give a sum of 636?**

Hard

How many terms of the AP 9, 17, 25, ... must be taken to give a sum of 636?

**Step 1:**  $a = 9, d = 8$ .

**Step 2:** Use  $S_n = n/2[2a + (n-1)d] = 636$ .

$$n/2[18 + 8(n-1)] = 636$$

$$n[18 + 8n - 8] = 1272$$

$$n[10 + 8n] = 1272$$

$$8n^2 + 10n - 1272 = 0$$

$$4n^2 + 5n - 636 = 0$$

**Step 3:** Use the quadratic formula or factorisation.

$$n = \frac{-5 \pm \sqrt{(25 + 4 \times 4 \times 636)}}{(8)} = \frac{-5 \pm \sqrt{(10201)}}{(8)} = \frac{-5 \pm 101}{(8)}$$

Taking positive value:  $n = 96/8 = 12$ .

**$\therefore$  12 terms must be taken.**

## Important Questions for CBSE Board Exam — Arithmetic Progressions

### 1-Mark Questions (Definition / Fill-in-the-Blank)

1. Define an arithmetic progression. Give one example. *[Answer: A sequence where each term is obtained by adding a fixed number (common difference) to the previous term. Example: 2, 5, 8, 11, ...]*
2. What is the common difference of the AP: 100, 90, 80, 70, ...? *[Answer:  $d = -10$ ]*
3. Find the first term of the AP whose 3rd term is 7 and common difference is 3. *[Answer:  $a = 7 - 2(3) = 1$ ]*

### 3-Mark Questions

1. Find the 31st term of an AP whose 11th term is 38 and 16th term is 73. [Answer:  $d = 7$ ,  $a = -32$ ,  $a_{31} = 178$ ]
2. Which term of the AP 3, 15, 27, 39, ... will be 132 more than its 54th term? [Answer: 11 more, so the 65th term]

### 5-Mark Questions (Long Answer)

1. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP. Show all working. [Answer:  $a = -13$ ,  $d = 5$ ; first three terms:  $-13, -8, -3$ ]

For more practice, see our sibling pages: [NCERT Solutions Class 10 Maths Chapter 5 Exercise 5.2](#) and [NCERT Solutions Class 10 Maths Chapter 5 Exercise 5.3](#).

## Common Mistakes Students Make in Arithmetic Progressions

**Mistake 1:** Students assume that if the first two differences are equal, the sequence is an AP.

**Why it's wrong:** You must check the difference between *all* consecutive pairs, not just the first two. See Q4(xv) above — the first two differences are equal but the third is not.

**Correct approach:** Check at least three consecutive differences before concluding it is an AP.

**Mistake 2:** Students confuse the taxi fare *per km* with the *cumulative* fare and get confused about which sequence to check.

**Why it's wrong:** The question asks about the list of fares after each km (cumulative), not the fare for each km alone.

**Correct approach:** List the total fare after 1 km, 2 km, 3 km, ... and then check if consecutive differences are equal.

**Mistake 3:** Students write  $d = a_1 - a_2$  instead of  $d = a_2 - a_1$ .

**Why it's wrong:** The common difference is always the *later* term minus the *earlier* term.

**Correct approach:** Always compute  $d = a_{n+1} - a_n$ , i.e., next term minus current term.

**Mistake 4:** In Q4(xii), students do not simplify  $\sqrt{(8)}$ ,  $\sqrt{(18)}$ ,  $\sqrt{(32)}$  before checking differences.

**Why it's wrong:** Without simplification, the pattern is not obvious and students incorrectly conclude it is not an AP.

**Correct approach:** Simplify surds first:  $\sqrt{8} = 2\sqrt{2}$ ,  $\sqrt{18} = 3\sqrt{2}$ ,  $\sqrt{32} = 4\sqrt{2}$ , then check differences.

**Mistake 5:** Students say compound interest forms an AP because the amount increases each year.

**Why it's wrong:** Increasing amounts do not automatically make an AP. The *differences* must be constant. In compound interest, the amount grows by a fixed *ratio*, not a fixed *amount*.

**Correct approach:** Calculate the actual amounts and subtract consecutive terms to verify.

## Exam Tips for 2026-27 CBSE Board — Arithmetic Progressions

### CBSE 2026-27 Marking Scheme Insights

- **Chapter weightage:** Arithmetic Progressions is part of the Algebra unit, which carries approximately 20 marks in the CBSE Class 10 board exam. Expect 1–2 questions directly from this chapter.
- **Always show working:** In the 2026-27 CBSE marking scheme, method marks are awarded even if the final answer is wrong. Never skip steps.
- **Exercise 5.1 question type:** Q1 (identifying APs) is a 2-mark question in most board papers. Write the differences explicitly and state your conclusion clearly.
- **Surd simplification:** For sequences involving  $\sqrt{2}$ ,  $\sqrt{8}$ ,  $\sqrt{18}$ , etc., always simplify to the form  $k\sqrt{2}$  first. This is a commonly tested skill.
- **Revision checklist:**
  - Know the definition of AP and how to identify one
  - Memorise the  $n$ th term formula  $a_n = a + (n-1)d$
  - Memorise both sum formulas  $S_n = n/2[2a + (n-1)d]$  and  $S_n = n/2(a+l)$
  - Practice writing AP terms from given  $a$  and  $d$  (both positive and negative  $d$ )
  - Know why compound interest and geometric sequences are NOT APs
- **This page covers the updated 2026-27 syllabus and exam pattern.** For the most current syllabus document, visit the [CBSE Academic website](https://www.cbseacademicwebsite.in/).

## Frequently Asked Questions — Arithmetic Progressions Class 10

### How do you identify if a sequence is an arithmetic progression?

A sequence is an AP if the difference between any two consecutive terms is always the same. Calculate  $a_2 - a_1$ ,  $a_3 - a_2$ ,  $a_4 - a_3$ , and so on. If all these differences are equal, the sequence is an AP and that constant value is the common difference  $d$ . If even one difference is different, the sequence is not an AP.

---

### What is the formula for the $n$ th term of an arithmetic progression?

The  $n$ th term of an AP is given by  $a_n = a + (n-1)d$ , where  $a$  is the first term,  $d$  is the common difference, and  $n$  is the position of the term. This formula is one of the most frequently tested in CBSE Class 10 board exams and should be memorised thoroughly.

---

### Is compound interest an example of arithmetic progression?

No, compound interest does NOT form an AP. The amount grows by a fixed percentage each year, not a fixed amount. This means the difference between consecutive yearly amounts keeps increasing. In compound interest, the ratio between consecutive terms is constant (not the difference), so it forms a geometric progression (GP), not an AP.

---

### What are real-life examples of arithmetic progressions for Class 10?

Real-life examples of AP include taxi fare (fixed base fare plus a constant rate per km), cost of digging a well (fixed cost for the first meter plus a constant rise per subsequent meter), salary increments by a fixed amount each year, rows of seats in an auditorium increasing by a fixed number, and saving a fixed amount each month. These examples are directly tested in CBSE Exercise 5.1.

---

### How many exercises are in Chapter 5 Arithmetic Progressions Class 10?

NCERT Class 10 Maths Chapter 5 Arithmetic Progressions has four exercises: Exercise 5.1 (identifying APs and writing terms — 4 questions), Exercise 5.2 (nth term — 20 questions), Exercise 5.3 (sum of n terms — 20 questions), and Exercise 5.4 (optional). Exercise 5.1 is the foundation exercise and is important for understanding the basic definition of AP before moving to harder topics.

---

### Why is the vacuum pump question NOT an arithmetic progression?

The vacuum pump removes  $\frac{1}{4}$  of the *remaining* air each time, not a fixed amount. So each removal takes away a smaller and smaller quantity. The differences between consecutive amounts of air are not equal — they keep decreasing. This makes it a geometric progression (with ratio  $\frac{3}{4}$ ), not an AP.

---

Source: ncertbooks.net — Updated for CBSE Academic Year 2026-27