Class: **X**	Subject: **Mathematics**	Session: **2025-26**
Chapter: **Ch 5: Arithmetic Progressions (PYQ)**		

PREVIOUS YEAR QUESTIONS (PYQ)

Chapter 5: Arithmetic Progressions

CBSE Board Exam 2019–2025 | With Direct Answers

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This document contains chapter-wise Previous Year Questions from CBSE Class X Board Examinations (2019–2025) for **Chapter 5: Arithmetic Progressions**. Each question includes the year of examination, marks allotted, and direct answer for quick revision.

⚠ **NOTE: All questions are strictly as per CBSE 2025-26 Syllabus. Topics included: nth term of AP ($a_n = a + (n-1)d$), Sum of first n terms ($S_n = n/2[2a + (n-1)d]$), Daily life problems based on AP.**

SECTION A: Multiple Choice Questions (1 Mark Each)

[CBSE 2024 | 1 Mark]

Q1. Three numbers in AP have the sum 30. What is its middle term?

(a) 4
(b) 10
(c) 16
(d) 8

Ans: (b) 10. Let terms be a−d, a, a+d. Sum = 3a = 30 ⇒ a = 10. Middle term = 10.

[CBSE 2023 | 1 Mark]

Q2. If a, b, c form an AP with common difference d, then the value of a − 2b − c is:

(a) 2a + 4d
(b) 0
(c) −2a − 4d
(d) −2a − 3d

Ans: (c) −2a − 4d. b = a+d, c = a+2d. a − 2(a+d) − (a+2d) = a − 2a − 2d − a − 2d = −2a − 4d

[CBSE 2023 | 1 Mark]

Q3. If k + 2, 4k − 6 and 3k − 2 are three consecutive terms of an AP, then the value of k is:

(a) 3
(b) −3
(c) 4
(d) −4

Ans: (a) 3. Common difference: (4k−6) − (k+2) = (3k−2) − (4k−6) ⇒ 3k − 8 = −k + 4 ⇒ 4k = 12 ⇒ k = 3

[CBSE 2020 | 1 Mark]

Q4. The common difference of the AP 1/p, (1−p)/p, (1−2p)/p, ... is:

(a) 1
(b) 1/p
(c) −1
(d) −1/p

Ans: (c) −1. d = (1−p)/p − 1/p = (1−p−1)/p = −p/p = −1

[CBSE 2021 | 1 Mark]

Q5. The 10th term from the end of the AP 4, 9, 14, ..., 254 is:

(a) 209
(b) 205
(c) 214
(d) 200

Ans: (a) 209. 10th from end = l − (10−1)d = 254 − 9 × 5 = 254 − 45 = 209

[CBSE 2020 | 1 Mark]

Q6. The first four terms of an AP whose first term is −2 and the common difference is −2 are:

(a) −2, 0, 2, 4
(b) −2, 4, −8, 16
(c) −2, −4, −6, −8
(d) −2, −4, −8, −16

Ans: (c) −2, −4, −6, −8. a = −2, d = −2. Terms: −2, −4, −6, −8

[CBSE 2022 | 1 Mark]

Q7. If the nth term of an AP is 7 − 4n, then the common difference is:

(a) −4
(b) 4
(c) 7
(d) −11

Ans: (a) −4. $a_n = 7 - 4n$. $a_1 = 3$, $a_2 = -1$. d = −1 − 3 = −4

[CBSE 2021 | 1 Mark]

Q8. The sum of the first 500 natural numbers is:

(a) 124750
(b) 125250
(c) 250500
(d) 125750

Ans: (b) 125250. S = n(n+1)/2 = 500 × 501/2 = 125250

[CBSE 2024 | 1 Mark]

Q9. If p − 1, p + 1, 3p − 1 are in AP, then the value of p is:

(a) 1
(b) 2
(c) 3
(d) 4

Ans: (b) 2. 2(p+1) = (p−1) + (3p−1) ⇒ 2p + 2 = 4p − 2 ⇒ 2p = 4 ⇒ p = 2

[CBSE 2020 | 1 Mark]

Q10. The 11th term of the AP −5, −5/2, 0, 5/2, ... is:

(a) −20
(b) 20
(c) −30
(d) 30

Ans: (b) 20. a = −5, d = 5/2. $a_{11} = -5 + 10 \times 5/2 = -5 + 25 = 20$

[CBSE 2024 | 1 Mark]

Q11. The sum of first n terms of an AP is given by $S_n = 3n^2 + 4n$. The common difference of the AP is:

(a) 3
(b) 4
(c) 6
(d) 7

Ans: (c) 6. $a_1 = S_1 = 7$. $a_2 = S_2 - S_1 = 16 - 7 = 13$. $d = 13 - 7 = 6$. (Or d = 2 × coefficient of $n^2 = 6$)

[CBSE 2019 | 1 Mark]

Q12. The value of x for which 2x, (x + 10) and (3x + 2) are three consecutive terms of an AP is:

(a) 6
(b) −6
(c) 18
(d) −18

Ans: (a) 6. $2(x+10) = 2x + (3x+2) \Rightarrow 2x + 20 = 5x + 2 \Rightarrow 3x = 18 \Rightarrow x = 6$

[CBSE 2021 | 1 Mark]

Q13. What is the common difference of an AP in which $a_{21} - a_7 = 84$?

(a) 4
(b) 6
(c) 14
(d) 84

Ans: (b) 6. $a_{21} - a_7 = (a+20d) - (a+6d) = 14d = 84 \Rightarrow d = 6$

SECTION B: Assertion-Reason Questions (1 Mark Each)

[CBSE 2023 | 1 Mark]

Q14. Assertion (A): a, b, c are in AP if and only if 2b = a + c.
Reason (R): The sum of the first n odd natural numbers is n^2.

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Ans: (b) Both A and R are true but R is not the correct explanation of A. The condition 2b = a+c is the definition of AP. Sum of odd numbers = n^2 is true but unrelated.

[CBSE 2024 | 1 Mark]

Q15. Assertion (A): The nth term of the AP 1, 5, 9, 13, ... is $4n - 3$.
Reason (R): The general term of an AP is $a_n = a + (n - 1)d$.

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Ans: (a) Both true and R is the correct explanation. $a = 1$, $d = 4$. $a_n = 1 + (n-1)4 = 4n - 3$. R explains how A is derived.

SECTION C: Short Answer Questions (2 Marks Each)

[CBSE 2023 | 2 Marks]

Q16. How many terms are there in the AP whose first and fifth terms are -14 and 2 respectively, and the last term is 62?

Ans: $a_5 = 2 \Rightarrow -14 + 4d = 2 \Rightarrow d = 4$. $a_n = 62 \Rightarrow -14 + (n-1)4 = 62 \Rightarrow 4n = 80 \Rightarrow n = 20$ terms.

[CBSE 2023 | 2 Marks]

Q17. Which term of the AP 65, 61, 57, 53, ... is the first negative term?

Ans: $a = 65$, $d = -4$. $a_n < 0 \Rightarrow 65 + (n-1)(-4) < 0 \Rightarrow 69 - 4n < 0 \Rightarrow n > 17.25$. So 18th term is the first negative term.

[CBSE 2020 | 2 Marks]

Q18. Find the 20th term of the AP: $-3, -1, 1, 3, \ldots$

Ans: $a = -3$, $d = 2$. $a_{20} = -3 + 19 \times 2 = -3 + 38 = 35$

[CBSE 2021 | 2 Marks]

Q19. If 7 times the 7th term of an AP is equal to 11 times the 11th term, find its 18th term.

Ans: $7(a + 6d) = 11(a + 10d) \Rightarrow 7a + 42d = 11a + 110d \Rightarrow -4a = 68d \Rightarrow a + 17d = 0 \Rightarrow a_{18} = 0$

[CBSE 2019 | 2 Marks]

Q20. If the 2nd term of an AP is 13 and the 5th term is 25, find its 7th term.

Ans: $a_2 = 13 \Rightarrow a + d = 13$. $a_5 = 25 \Rightarrow a + 4d = 25$. Subtracting: $3d = 12 \Rightarrow d = 4$, $a = 9$. $a_7 = 9 + 6(4) = 33$

[CBSE 2022 | 2 Marks]

Q21. Find the sum of first 10 multiples of 6.

Ans: AP: 6, 12, 18, ..., 60. $S_{10} = 10/2 \times (6 + 60) = 5 \times 66 = 330$

[CBSE 2020 | 2 Marks]

Q22. In an AP, if $a = 1$, the common difference $d = 3$ and $a_n = 22$, find n.

Ans: $a_n = a + (n-1)d \Rightarrow 22 = 1 + (n-1)3 \Rightarrow 21 = 3n - 3 \Rightarrow n = 8$

SECTION D: Short Answer Questions (3 Marks Each)

[CBSE 2024 | 3 Marks]

Q23. If the sum of the first 7 terms of an AP is 49 and that of the first 17 terms is 289, find the sum of its first 20 terms.

Ans: $S_7 = 7/2(2a + 6d) = 49 \Rightarrow 2a + 6d = 14$ ... (i). $S_{17} = 17/2(2a + 16d) = 289 \Rightarrow 2a + 16d = 34$ ... (ii). Subtracting: $10d = 20 \Rightarrow d = 2$, $a = 1$. $S_{20} = 20/2(2 + 38) = 10 \times 40 = 400$

[CBSE 2021 | 3 Marks]

Q24. How many terms of the AP 45, 39, 33, ... must be taken so that their sum is 180? Explain the double answer.

Ans: $S = n/2[2(45) + (n-1)(-6)] = n/2[96 - 6n] = 180 \Rightarrow n(96 - 6n) = 360 \Rightarrow n^2 - 16n + 60 = 0 \Rightarrow (n-6)(n-10) = 0 \Rightarrow n = 6$ or 10. Both valid: terms 7 to 10 (9, 3, −3, −9) sum to zero, so $S_6 = S_{10} = 180$.

[CBSE 2022 | 3 Marks]

Q25. The sum of 4th and 8th terms of an AP is 24. The sum of 6th and 10th terms is 44. Find the AP.

Ans: $a_4 + a_8 = (a+3d) + (a+7d) = 2a + 10d = 24$ ... (i). $a_6 + a_{10} = 2a + 14d = 44$ ... (ii). Subtracting: $4d = 20 \Rightarrow d = 5$, $a = -13$. AP: −13, −8, −3, 2, 7, ...

[CBSE 2020 | 3 Marks]

Q26. If S_n denotes the sum of first n terms of an AP whose common difference is d and first term is a, find $S_n - 2S_{n-1} + S_{n-2}$.

Ans: $S_n - S_{n-1} = a_n$ and $S_{n-1} - S_{n-2} = a_{n-1}$. So $S_n - 2S_{n-1} + S_{n-2} = a_n - a_{n-1} = d$

[CBSE 2019 | 3 Marks]

Q27. The sum of three numbers in AP is 12 and sum of their cubes is 288. Find the numbers.

Ans: Let numbers be a−d, a, a+d. Sum = $3a = 12 \Rightarrow a = 4$. Sum of cubes: $(4-d)^3 + 64 + (4+d)^3 = 288 \Rightarrow 2[64 + 48d^2 + 2d^2] = 224$ (expanding) $\Rightarrow d^2 = 4 \Rightarrow d = \pm 2$. Numbers: 2, 4, 6 or 6, 4, 2

SECTION E: Long Answer Questions (5 Marks Each)

[CBSE 2022 | 5 Marks]

Q28. The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.

Ans: $S_n = n/2(a + l) \Rightarrow 400 = n/2(5 + 45) \Rightarrow 400 = 25n \Rightarrow n = 16$. $l = a + (n-1)d \Rightarrow 45 = 5 + 15d \Rightarrow d = 40/15 = 8/3$

[CBSE 2019 | 5 Marks]

Q29. The sum of first 6 terms of an AP is 42 and the ratio of its 10th term to its 30th term is 1 : 3. Find the first term and the 13th term of the AP.

Ans: $S_6 = 6/2(2a + 5d) = 42 \Rightarrow 2a + 5d = 14$ ... (i). $a_{10}/a_{30} = 1/3 \Rightarrow 3(a + 9d) = a + 29d \Rightarrow 2a = 2d \Rightarrow a = d$ ... (ii). From (i): $2d + 5d = 14 \Rightarrow d = 2$, $a = 2$. $a_{13} = 2 + 12(2) = 26$

[CBSE 2024 | 5 Marks]

Q30. If the sum of first n terms of an AP is given by $S_n = 4n - n^2$, find the nth term and hence find its 20th term.

Ans: $a_n = S_n - S_{n-1} = (4n - n^2) - [4(n-1) - (n-1)^2] = 4n - n^2 - 4n + 4 + n^2 - 2n + 1 = 5 - 2n$. $a_{20} = 5 - 40 = -35$

SECTION F: Case Study Based Questions (4 Marks Each)

[CBSE 2025 | 4 Marks]

Q31. Case Study: A school is organizing a charity run. The run is planned as a series of rounds around a track, with each round being 300 metres. The distance of each subsequent round is increased by 50 metres. The total number of rounds planned is 10.
(i) Write the 4th, 5th and 6th term of the AP so formed.
(ii) What is the distance of the last (10th) round?
(iii) Find the total distance covered in all 10 rounds.

Ans: AP: 300, 350, 400, ... a = 300, d = 50. (i) $a_4 = 450$ m, $a_5 = 500$ m, $a_6 = 550$ m. (ii) $a_{10} = 300 + 9(50) = 750$ m. (iii) $S_{10} = 10/2(300 + 750) = 5 \times 1050 = 5250$ m

[CBSE 2024 | 4 Marks]

Q32. Case Study: In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row.
(i) How many rows are there in the flower bed?
(ii) How many rose plants are there in total?
(iii) If each rose plant costs Rs 50, find the total cost.

Ans: AP: 23, 21, 19, ... 5. a = 23, d = −2, l = 5. (i) $5 = 23 + (n-1)(-2) \Rightarrow n = 10$ rows. (ii) $S_{10} = 10/2(23 + 5) = 5 \times 28 = 140$ plants. (iii) Cost = $140 \times 50 = $ Rs 7000

[CBSE 2023 | 4 Marks]

Q33. Case Study: Jaspal Singh takes a loan of Rs 118000 and pays back in monthly instalments. The first instalment is Rs 1000 and it increases by Rs 100 every month.
(i) What is the amount paid in 30th instalment?
(ii) What is the total amount paid after 30 instalments?
(iii) How much loan is still remaining after 30 instalments?

Ans: AP: 1000, 1100, 1200, ... a = 1000, d = 100. (i) $a_{30} = 1000 + 29(100) =$ Rs 3900. (ii) $S_{30} = 30/2(1000 + 3900) = 15 \times 4900 =$ Rs 73500. (iii) Remaining = 118000 − 73500 = Rs 44500

★ PYQ SUMMARY & ANALYSIS

Topic	Years Asked	Frequency	Marks
Finding nth term (a_n)	2019–2025	Every Year	1–2
Common difference (d)	2019–2024	Every Year	1–2
AP condition (2b = a+c)	2019–2024	5 times	1
Sum of n terms (S_n)	2019–2025	Every Year	2–5
Number of terms	2019–2023	4 times	2–3
S_n given, find a_n or d	2020–2024	4 times	1–3
Word problems (AP application)	2019–2025	Every Year	3–5
Case Study (charity run, loans)	2023–2025	3 times	4

Key Observations for Students:

- ✔ Finding nth term and common difference are the MOST asked topics — 1–2 mark MCQs every year.
- ✔ Sum of n terms (S_n) is guaranteed for 2–5 marks in every board exam.
- ✔ "Three numbers in AP" type questions are very common — use (a−d), a, (a+d) form.
- ✔ Case Study questions (2023–2025 trend) — real-life AP applications carry 4 marks.
- ✔ MUST MEMORIZE: $a_n = a + (n-1)d$, $S_n = n/2[2a + (n-1)d] = n/2(a + l)$
- ✔ If S_n is given as polynomial, $a_n = S_n - S_{n-1}$ and d = 2 × coefficient of n^2.
- ✔ Expected marks from this chapter: 5–8 marks in Board Exam.

"Practice makes perfect. Solve PYQs to master your Board Exam!"

Best Wishes for Your Board Exam!

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