

CLASS 10 — MATHEMATICS

Chapter: Arithmetic Progressions

Practice Worksheet | CBSE Pattern

Maximum Marks: 40

Time Allowed: 1 hour 30 minutes

Name: _____

Class/Section: _____ Date: _____

General Instructions:

1. All questions are compulsory.
2. Read each question carefully before answering.
3. Show complete working for questions requiring calculations or proofs.
4. Select only one option for each MCQ.
5. Marks for each question are indicated alongside the question.
6. Write mathematical steps clearly and use appropriate notation.

This paper has 21 questions in five sections: A (Q1–Q10, 1 mark each), B (Q11–Q15, 2 marks each), C (Q16–Q19, 3 marks each), D (Q20, 4 marks) and E (Q21, case study, 4 marks).

SECTION A

Multiple Choice Questions — Q1 to Q10 carry 1 mark each.

- Q1.** Which of the following lists of numbers forms an AP? **[1 mark]**
(A) 1, 4, 9, 16, ... (B) 2, 4, 8, 16, ...
(C) -3, -1, 1, 3, ... (D) $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots$
- Q2.** The common difference of the AP $\frac{3}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{3}{2}, \dots$ is **[1 mark]**
(A) 1 (B) -1
(C) $\frac{1}{2}$ (D) $-\frac{1}{2}$
- Q3.** The 15th term of the AP 7, 3, -1, -5, ... is **[1 mark]**
(A) -53 (B) 63
(C) -45 (D) -49
- Q4.** Which term of the AP 4, 9, 14, 19, ... is 109? **[1 mark]**
(A) 21st (B) 22nd
(C) 23rd (D) 20th
- Q5.** The sum of the first 20 odd natural numbers is **[1 mark]**
(A) 200 (B) 210
(C) 400 (D) 441
- Q6.** If $k + 2$, $4k - 6$ and $3k - 2$ are three consecutive terms of an AP, **[1 mark]**
then the value of k is
(A) 3 (B) 2
(C) 4 (D) 5

- Q7.** The n th term of an AP is $7 - 3n$. The common difference of the AP is [1 mark]
- (A) 3 (B) 4
(C) 7 (D) -3

- Q8.** The sum of the first n terms of an AP is given by $S_n = 3n^2 + 5n$. The 10th term of the AP is [1 mark]
- (A) 62 (B) 56
(C) 350 (D) 68

In Q9 and Q10, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- Q9. Assertion (A):** No term of the AP 31, 28, 25, ... is equal to 0. [1 mark]
Reason (R): The common difference of the AP 31, 28, 25, ... is negative.

- (A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

- Q10. Assertion (A):** The sum of the first n natural numbers is $\frac{n(n+1)}{2}$. [1 mark]
Reason (R): The natural numbers 1, 2, 3, ... form an AP with $a = 1$ and $d = 1$, and $S_n = \frac{n}{2}[2a + (n-1)d]$.

- (A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

SECTION B

Very Short Answer Questions — Q11 to Q15 carry 2 marks each.

Q11. Find the 20th term of the AP $-11, -7, -3, 1, \dots$ **[2 marks]**

Q12. Find the middle term of the AP $6, 13, 20, \dots, 216$. **[2 marks]**

Q13. How many three-digit numbers are divisible by 7? **[2 marks]**

Q14. Find the sum: $5 + 9 + 13 + \dots + 101$. **[2 marks]**

Q15. Find the 10th term from the last term of the AP $4, 9, 14, \dots, 254$. **[2 marks]**

SECTION C

Short Answer Questions — Q16 to Q19 carry 3 marks each.

Q16. How many terms of the AP 45, 42, 39, ... must be taken so that their **[3 marks]** sum is 360? Explain the reason for the double answer.

Q17. The sum of the first 7 terms of an AP is 63, and the sum of its next 7 **[3 marks]** terms is 161. Find the 28th term of the AP.

Q18. The 7th term of an AP is 32 and its 13th term is 62. Find the AP and **[3 marks]** the sum of its first 20 terms.

Q19. Find the sum of all two-digit natural numbers that are not divisible **[3 marks]** by 3.

SECTION D

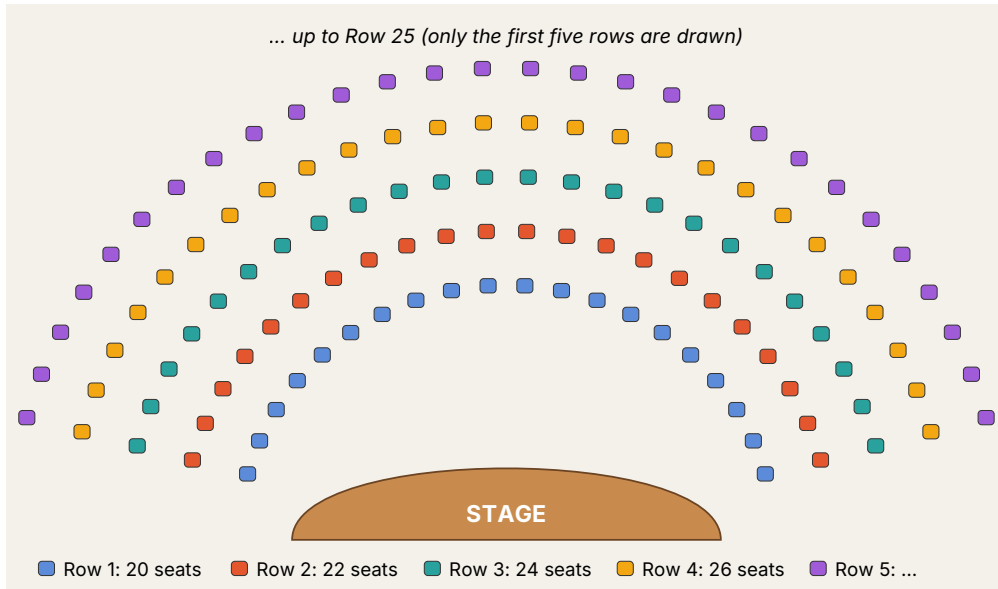
Long Answer Question — Q20 carries 4 marks.

- Q20.** If the m th term of an AP is $\frac{1}{n}$ and the n th term is $\frac{1}{m}$, where $m \neq n$, **[4 marks]**
show that the sum of its first mn terms is $\frac{mn + 1}{2}$.
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SECTION E

Case Study Based Question — Q21 carries 4 marks.

- Q21.** An open-air theatre has 25 rows of seats arranged around a stage. **[4 marks]**
The first row has 20 seats, and each row has 2 more seats than the row in front of it, as shown in the figure.



Based on the above information, answer the following questions:

- (i) How many seats are there in the 10th row? **[1 mark]**

- (ii) Which row has 60 seats? **[1 mark]**

- (iii) Find the total number of seats in the theatre. If the first 15 rows are fully booked, how many seats are still available? **[2 marks]**

— End of Question Paper —