MIND CURVE · INFINITY THINK BEYOND

Arithmetic Progressions

Chapter 5 · Previous Year Questions with Answers · Class X Mathematics Basic (241)

01 TOPIC 1 Identifying an AP, Common Difference & nth Term

QUICK RECAP

- A list $a,\ a+d,\ a+2d,\ldots$ is an AP with first term a and common difference $d = a_{k+1} - a_k$ (constant). d may be positive, negative or zero.
- nth term: $a_n = a + (n-1)d$. nth term from the end of an AP with last term l: $l - (n-1)d$.
- $a,\ b,\ c$ are in AP $\iff 2b = a + c$ (b is the arithmetic mean). Number of terms: $n = \dfrac{l-a}{d} + 1$.
- Recall: multiples of k between two numbers form an AP with $d = k$.

Q1 MCQ · 1 mark — **2023** – 430/C/1, 430/C/2, 430/C/3

If common difference of an A.P. is -6, then value of $a_{20} - a_{14}$ is :

(A) 36 (B) 6
(C) -36 (D) -6

ANSWER (C) -36

Q2 MCQ · 1 mark — **2023** – 430/C/B

Which term of an AP 21, 42, 63, 84, ... is 210 ?

(A) 12^{th} (B) 11^{th}
(C) 10^{th} (D) 9^{th}

ANSWER (C) 10^{th}

Q3 MCQ · 1 mark — **2023** – 430/1/1, 430/1/2

The seventh term of an A.P. whose first term is 28 and common difference -4, is

(A) 0 (B) 4
(C) 52 (D) 56

ANSWER *

$a_7 = 28 + 6(-4) = 4$

(B) 4

Q4 MCQ · 1 mark — **2023** – 430/1/3

In an AP, if $d = -4$, $n = 7$ and $a_n = 4$, then the value of a is

(A) 6 (B) 7
(C) 20 (D) 28

ANSWER *

$4 = a + 6(-4) \Rightarrow a = 28$

(D) 28

Q5 MCQ · 1 mark **2023** – 430/2/1, 430/2/3

How many terms are there in the A.P. given below ? $14,\ 19,\ 24,\ 29,\ \ldots,\ 119$

(A) 18 (B) 14
(C) 22 (D) 21

ANSWER *

$14 + (n-1)5 = 119 \Rightarrow n = 22$

(C) 22

Q6 MCQ · 1 mark **2023** – 430/5/1, 430/5/2, 430/5/3

The 8^{th} term of an A.P. is 17 and its 14^{th} term is 29. The common difference of this A.P. is :

(A) 3 (B) 2
(C) 5 (D) -2

ANSWER *

$6d = 29 - 17 = 12 \Rightarrow d = 2$

(B) 2

Q7 MCQ · 1 mark **2023** – 430/6/1, 430/6/3

If $-5,\ x,\ 3$ are three consecutive terms of an A.P., then the value of x is

(A) -2 (B) 2
(C) 1 (D) -1

ANSWER *

$2x = -5 + 3 \Rightarrow x = -1$

(D) -1

Q8 MCQ · 1 mark **2023** – 430/6/2

The 20^{th} term of an A.P, whose first term is -2 and the common difference is 4, is

(A) 78 (B) 74
(C) -36 (D) -34

ANSWER *

$a_{20} = -2 + 19 \times 4 = 74$

(B) 74

Q9 MCQ · 1 mark **2024** – 430(B)/S

The 8^{th} term of an A.P., whose first two terms are -5 and 2 respectively, is :

(A) -54
(B) 44
(C) -61
(D) -33

ANSWER **(B) 44**

Q10 MCQ · 1 mark **2024** – 430(B)

The 30^{th} term of the AP $10,\ 7,\ 4,\ \ldots$ is :

(A) 87
(B) 77
(C) -77
(D) -87

ANSWER *
$a = 10,\ d = -3; a_{30} = 10 + 29(-3) = -77$
(C) -77

Q11 MCQ · 1 mark **2024** – 430/1/1, 430/1/2, 430/1/3

In an A.P., if $a = 8$ and $a_{10} = -19$, then value of d is :

(A) 3
(B) $-\frac{11}{9}$
(C) $-\frac{27}{10}$
(D) -3

ANSWER *
$8 + 9d = -19 \Rightarrow 9d = -27 \Rightarrow d = -3$
(D) -3

Q12 MCQ · 1 mark **2024** – 430/2/1, 430/2/3

In an A.P., if $d = -4$ and $a_7 = 4$, then the first term a is equal to

(A) 6
(B) 7
(C) 20
(D) 28

ANSWER *
$a + 6(-4) = 4 \Rightarrow a = 28$
(D) 28

Q13 MCQ · 1 mark **2024** – 430/2/2

If the first term of an AP is -3 and common difference -2, then the seventh term is

(A) -9
(B) 9
(C) -17
(D) -15

ANSWER *
$a_7 = -3 + 6(-2) = -15$
(D) -15

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q14 MCQ · 1 mark — **2024** – 430/3/1

The common difference of an A.P. whose n^{th} term is given by $a_n = 5n - 1$, is :

(A) 1 (B) 6
(C) 5 (D) 4

ANSWER *
$d = a_{n+1} - a_n = 5$
(C) 5

Q15 MCQ · 1 mark — **2024** – 430/3/2

The 30^{th} term of the A.P. $-3,\ -7,\ -11,\ \ldots$ is :

(A) 113 (B) -117
(C) -119 (D) -120

ANSWER *
$a_{30} = -3 + 29(-4) = -119$
(C) -119

Q16 MCQ · 1 mark — **2024** – 430/4/1, 430/4/2

The common difference of an A.P., if $a_{23} - a_{19} = 32$, is :

(A) 8 (B) -8
(C) -4 (D) 4

ANSWER *
$a_{23} - a_{19} = 4d = 32 \Rightarrow d = 8$
(A) 8

Q17 MCQ · 1 mark — **2025** – 430(B)

The 8^{th} term from the end of the A.P. $3,\ 7,\ 11,\ 15,\ \ldots,\ 143$ is

(A) 135 (B) 125
(C) 115 (D) 111

ANSWER *
8^{th} term from end $= l - 7d = 143 - 7 \times 4 = 115$
(C) 115

Q18 MCQ · 1 mark — **2025** – 430/4/1, 430/4/2

If n^{th} term of an A.P. is $5n - 6$, then its common difference is :

(A) -6 (B) $5n$
(C) 5 (D) 6

ANSWER *

$d = a_{n+1} - a_n = [5(n+1) - 6] - (5n - 6) = 5$

(C) 5

Q19 MCQ · 1 mark **2025** – 430/4/1, 430/4/2, 430/4/3

The 20^{th} term of the A.P. : $10\sqrt{2},\ 6\sqrt{2},\ 2\sqrt{2},\ \ldots$ is :

(A) $-76 + 10\sqrt{2}$ (B) $-62\sqrt{2}$
(C) $-66\sqrt{2}$ (D) $86\sqrt{2}$

ANSWER *

$d = -4\sqrt{2}$; $a_{20} = 10\sqrt{2} + 19(-4\sqrt{2}) = -66\sqrt{2}$

(C) $-66\sqrt{2}$

Q20 MCQ · 1 mark **2025** – 430/4/3

In an A.P., $a_n - a_{n-4} = 32$. Its common difference is :

(A) -8 (B) 8
(C) $4n$ (D) 4

ANSWER *

$a_n - a_{n-4} = 4d = 32 \Rightarrow d = 8$

(B) 8

Q21 MCQ · 1 mark **2025** – 430/5/1, 430/5/3

10^{th} term of the A.P. : $-12,\ -19,\ -26,\ \ldots$ is

(A) -75 (B) -65
(C) 51 (D) -82

ANSWER *

$d = -7$; $a_{10} = -12 + 9(-7) = -75$

(A) -75

Q22 MCQ · 1 mark **2025** – 430/5/2

The 16^{th} term of the A.P. : $5\sqrt{3},\ 2\sqrt{3},\ -\sqrt{3},\ \ldots$ is

(A) $-25\sqrt{3}$ (B) $-40\sqrt{3}$
(C) $50\sqrt{3}$ (D) $-45 + 5\sqrt{3}$

ANSWER *

$d = -3\sqrt{3}$; $a_{16} = 5\sqrt{3} + 15(-3\sqrt{3}) = -40\sqrt{3}$

(B) $-40\sqrt{3}$

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q23 MCQ · 1 mark — **2025** – 430/6/1, 430/6/3

22^{nd} term of the A.P. : $\frac{3}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{3}{2}, \ldots$ is

(A) $\frac{45}{2}$
(B) -9
(C) $-\frac{39}{2}$
(D) -21

ANSWER *

$d = -1; a_{22} = \frac{3}{2} + 21(-1) = -\frac{39}{2}$

(C) $-\frac{39}{2}$

Q24 MCQ · 1 mark — **2025** – 430/6/2

15^{th} term of the A.P. $\frac{13}{3}, \frac{9}{3}, \frac{5}{3}, \ldots$ is

(A) 23
(B) $-\frac{53}{3}$
(C) -11
(D) $-\frac{43}{3}$

ANSWER *

$d = -\frac{4}{3}; a_{15} = \frac{13}{3} + 14\left(-\frac{4}{3}\right) = -\frac{43}{3}$

(D) $-\frac{43}{3}$

Q25 MCQ · 1 mark — **2026 (I)** – 430(B)

The n^{th} term of an A.P. is $3n + 2$. The common difference is :

(A) 8
(B) 2
(C) 5
(D) 3

ANSWER *

$d = a_{n+1} - a_n = 3$

(D) 3

Q26 MCQ · 1 mark — **2026 (I)** – 430/4/1, 430/4/2, 430/4/3

n^{th} term of the A.P. $-\frac{3}{2}, \frac{3}{2}, \frac{9}{2}, \ldots$ is :

(A) $\frac{3n}{2} - 3$
(B) $3n - \frac{9}{2}$
(C) $\frac{3n - 9}{2}$
(D) $3n + \frac{3}{2}$

ANSWER *

$a = -\frac{3}{2}, d = 3; a_n = -\frac{3}{2} + (n-1)3 = 3n - \frac{9}{2}$

(B) $3n - \frac{9}{2}$

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q27 MCQ · 1 mark — **2026 (I)** – 430/4/2

n^{th} term of an A.P. is $5n - 15$. The common difference of the A.P. is :

(A) $5n$ (B) 5
(C) -5 (D) 10

ANSWER *
$d = a_{n+1} - a_n = 5$
(B) 5

Q28 MCQ · 1 mark — **2026 (I)** – 430/5/1, 430/5/2

n^{th} term of the A.P. : $-\frac{1}{3}, \frac{4}{3}, 3, \ldots$ is

(A) $\frac{5n-9}{3}$ (B) $\frac{5n-6}{3}$
(C) $\frac{3n-4}{3}$ (D) $\frac{3n+2}{3}$

ANSWER *
$a = -\frac{1}{3}, d = \frac{5}{3}; a_n = -\frac{1}{3} + (n-1)\frac{5}{3} = \frac{5n-6}{3}$
(B) $\frac{5n-6}{3}$

Q29 MCQ · 1 mark — **2026 (I)** – 430/5/1, 430/5/3

If $-26, x, 2$ are in A.P., then the value of x is

(A) 14 (B) -13
(C) -12 (D) -14

ANSWER *
$2x = -26 + 2 = -24 \Rightarrow x = -12$
(C) -12

Q30 MCQ · 1 mark — **2026 (I)** – 430/5/2

If $-\frac{20}{9}, -\frac{2}{9}, \frac{16}{9}, \ldots$ are in A.P., then next term of the sequence is

(A) $\frac{32}{9}$ (B) $\frac{46}{9}$
(C) $\frac{2}{9}$ (D) $\frac{34}{9}$

ANSWER *
$d = -\frac{2}{9} + \frac{20}{9} = \frac{18}{9} = 2$; next term $= \frac{16}{9} + \frac{18}{9} = \frac{34}{9}$
(D) $\frac{34}{9}$

Q31 MCQ · 1 mark — **2026 (I)** – 430/5/3

If 14^{th} term of an A.P. is 4 and its 15^{th} term is zero, then its first term is

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

(A) -48
(B) -56
(C) 56
(D) 48

ANSWER *
$d = a_{15} - a_{14} = -4$; $a + 13(-4) = 4 \Rightarrow a = 56$
(C) 56

Q32 MCQ · 1 mark — **2026 (II)** – 430/7/1, 430/7/2, 430/7/3

The n^{th} term of the AP $-18,\ -2,\ 14,\ \ldots$ is :

(A) $16n - 2$
(B) $20n - 38$
(C) $16n - 34$
(D) $20n + 2$

ANSWER (C) $16n - 34$

Q33 MCQ · 1 mark — **2026 (II)** – 430/8/1, 430/8/2

The common difference of the A.P. $2,\ -2,\ -6,\ -10,\ \ldots$ is

(A) 4
(B) 10
(C) -4
(D) -16

ANSWER (C) -4

Q34 MCQ · 1 mark — **2026 (II)** – 430/8/1, 430/8/2, 430/8/3

The fourth term of the A.P. $\sqrt{5},\ \sqrt{20},\ \sqrt{45},\ \ldots$ is

(A) 25
(B) $\sqrt{80}$
(C) $\sqrt{125}$
(D) $\sqrt{85}$

ANSWER (B) $\sqrt{80}$

Q35 MCQ · 1 mark — **2026 (II)** – 430/8/3

The total number of terms of an A.P. $5,\ 9,\ 13,\ \ldots,\ 185$ is

(A) 31
(B) 51
(C) 46
(D) 30

ANSWER (C) 46

Q36 Assertion–Reason · 1 mark — **2024** – 430/5/1, 430/5/3

Assertion (A) : Common difference of the A.P. $5,\ 1,\ -3,\ -7,\ \ldots$ is 4.
Reason (R) : Common difference of the A.P. $a_1,\ a_2,\ a_3,\ \ldots,\ a_n$ is obtained by $d = a_n - a_{n-1}$.

(A) Both true, R explains A · (B) Both true, R does not explain A · (C) A true, R false · (D) A false, R true

ANSWER *
$d = 1 - 5 = -4 \neq 4$, so A is false; R is true
(D) Assertion (A) is false, but Reason (R) is true.

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q37 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/6/1, 430/6/2

Find the 20^{th} term of the A.P. whose 7^{th} term is 24 less than the 11^{th} term, the first term being 12.

ANSWER

$a_7 = a_{11} - 24 \Rightarrow a + 6d = a + 10d - 24$ — 1

$4d = 24 \Rightarrow d = 6$ — ½

$a_{20} = a + 19d = 12 + 19 \times 6 = 126$ — ½

$a_{20} = 126$

Q38 Very Short Answer · 2 marks — **2022** – 430/6/1

The n^{th} term of a sequence is given by $a_n = \dfrac{n(n+1)(2n+1)}{6}$. Write the first three terms of the sequence. Does this sequence form an A.P. ? Justify your answer.

ANSWER

$n = 1$: $a_1 = \dfrac{1(2)(3)}{6} = 1$ — ½

$n = 2$: $a_2 = \dfrac{2(3)(5)}{6} = 5$ — ½

$n = 3$: $a_3 = \dfrac{3(4)(7)}{6} = 14$; terms $1,\ 5,\ 14$ — ½

$a_3 - a_2 \neq a_2 - a_1$ $\therefore$ given sequence is not an A.P. — ½

$1,\ 5,\ 14$; **not an A.P.**

Q39 Very Short Answer · 2 marks — **2022** – 430/6/3

If $\dfrac{4}{5},\ k,\ 2$ are three consecutive terms of an A.P., then find the value of k.

ANSWER

$\therefore\ 2 - k = k - \dfrac{4}{5}$ — 1

$\Rightarrow 2 + \dfrac{4}{5} = k + k \Rightarrow k = \dfrac{7}{5}$ — 1

$k = \dfrac{7}{5}$

Q40 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/B/6

Find the number of terms in the following AP : $4,\ 10,\ 16,\ \ldots,\ 208$

ANSWER

$208 = 4 + (n-1)6$ — 1

$\Rightarrow n = 35$ — 1

$n = 35$

Q41 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/2/1, 430/2/2, 430/2/3

Which term of the A.P. $3,\ 8,\ 13,\ 18,\ \ldots$ is 78 ?

ANSWER *

$3 + (n-1)5 = 78$

$n - 1 = 15 \Rightarrow n = 16$

16^{th} **term**

Q42 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/2/1, 430/2/2, 430/2/3

Find the common difference of an A.P. whose n^{th} term is given by $a_n = 6n - 5$.

ANSWER *

$a_1 = 1, a_2 = 7$

$d = a_2 - a_1 = 6$

$d = 6$

Q43 Very Short Answer · 2 marks — **2022** – 430/3/1

Which term of AP : $\frac{11}{4}, \frac{7}{2}, \frac{17}{4}, \ldots$ is $\frac{53}{4}$?

ANSWER *

$d = \frac{7}{2} - \frac{11}{4} = \frac{3}{4}$

$\frac{11}{4} + (n-1)\frac{3}{4} = \frac{53}{4} \Rightarrow n - 1 = 14 \Rightarrow n = 15$

15^{th} **term**

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q44 Very Short Answer · 2 marks — **2022** – 430/3/2

Find the 15^{th} term of an AP whose first term is 17 and fourth term is 44.

ANSWER *

$17 + 3d = 44 \Rightarrow d = 9$

$a_{15} = 17 + 14 \times 9 = 143$

$a_{15} = 143$

Q45 Very Short Answer · 2 marks — **2022** – 430/3/3

Find the 8^{th} term of an AP whose first term is -24 and 11^{th} term is 21.

ANSWER *

$-24 + 10d = 21 \Rightarrow d = \frac{9}{2}$

$a_8 = -24 + 7 \times \frac{9}{2} = \frac{15}{2}$

$a_8 = \frac{15}{2}$

Q46 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/4/1, 430/4/2

Determine the 36^{th} term of the A.P. whose first two terms are -3 and 4 respectively.

ANSWER *

$a = -3,\ d = 7$

$a_{36} = -3 + 35 \times 7 = 242$

$\boxed{a_{36} = 242}$

Q47 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/4/1, 430/4/2

Write the next two terms of the A.P. : $\sqrt{27},\ \sqrt{48},\ \sqrt{75},\ \ldots$

ANSWER *

$3\sqrt{3},\ 4\sqrt{3},\ 5\sqrt{3},\ \ldots$ with $d = \sqrt{3}$

Next two terms: $6\sqrt{3} = \sqrt{108}, 7\sqrt{3} = \sqrt{147}$

$\boxed{\sqrt{108},\ \sqrt{147}}$

Q48 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/4/3

Find the 15^{th} term from the end (towards first term) of the A.P. $3,\ 8,\ 13,\ \ldots,\ 253$.

ANSWER *

$l = 253,\ d = 5$

15^{th} term from the end $= 253 - 14 \times 5 = 183$

$\boxed{183}$

Q49 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/4/3

Write the next two terms of the A.P. : $\sqrt{5},\ \sqrt{20},\ \sqrt{45},\ \ldots$

ANSWER *

$\sqrt{5},\ 2\sqrt{5},\ 3\sqrt{5},\ \ldots$ with $d = \sqrt{5}$

Next two terms: $4\sqrt{5} = \sqrt{80}, 5\sqrt{5} = \sqrt{125}$

$\boxed{\sqrt{80},\ \sqrt{125}}$

Q50 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/B/5

Which term of the AP $2,\ 11,\ 20,\ 29,\ \ldots$ will be 99 more than its 25^{th} term ?

ANSWER *

$d = 9$; $a_n - a_{25} = (n - 25) \times 9 = 99$

$n - 25 = 11 \Rightarrow n = 36$

$\boxed{36^{\text{th}} \text{ term}}$

Q51 Very Short Answer · 2 marks · Internal choice (OR) part — **2022** – 430/B/5

Find the number of odd numbers between 20 and 70.

ANSWER *

$21,\ 23,\ \ldots,\ 69$: $21 + (n-1)2 = 69$

$n = 25$

25

Q52 Very Short Answer · 2 marks — **2025** – 430(B)

Find the middle term(s) of the A.P. $9,\ 15,\ 21,\ \ldots,\ 243$.

ANSWER *

$a = 9,\ d = 6$: $243 = 9 + (n-1)6 \Rightarrow n = 40$ (even), so there are two middle terms, a_{20} and a_{21}

$a_{20} = 9 + 19 \times 6 = 123,\ a_{21} = 129$

20^{th} and 21^{st} terms: 123 and 129

Q53 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (II)** – 430/8/1, 430/8/3

Which term of the A.P. $6,\ 12,\ 18,\ \ldots$ will be 150 more than its 25^{th} term ?

ANSWER

Let a_n be 150 more than a_{25} $\therefore\ a_n = 150 + a + 24d$ — 1

$6 + (n-1)6 = 150 + 6 + 24 \times 6$ — ½

$\Rightarrow n = 50$ — ½

50^{th} term

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q54 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (II)** – 430/8/1, 430/8/3

Determine the n^{th} term of an A.P. whose 5^{th} term is 3 and 12^{th} term is 17.

ANSWER

$a + 4d = 3$ ...(1) — ½

$a + 11d = 17$ ...(2) — ½

Solving (1) and (2), $a = -5$ and $d = 2$ — ½

$a_n = -7 + 2n$ — ½

$a_n = 2n - 7$

Q55 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (II)** – 430/8/2

The 3^{rd} and the 8^{th} terms of an A.P. are 13 and 38 respectively. Find its 11^{th} term.

ANSWER

$t_3 = a + 2d = 13,\ t_8 = a + 7d = 38\ \therefore\ d = 5$ and $a = 3$ — 1

$t_{11} = a + 10d = 3 + 10 \times 5 = 53$ — 1

$a_{11} = 53$

Q56 Short Answer · 3 marks — **2022** – 430/B/6

Find the 12^{th} term from the last term (towards the first term) of the A.P. : $15,\ 12,\ 9,\ \ldots,\ -57$.

ANSWER

Reversing the AP we get $-57,\ -54,\ -51,\ \ldots$ — 1

$a = -57,\ d = 3$ — 1

$\therefore\ a_{12} = -57 + 11 \times 3 = -24$ — 1

-24

Q57 Short Answer · 3 marks — **2022** – 430/4/2

In an A.P., the first term is 12 and the common difference is 6. If the last term of the A.P. is 252, then find its middle term.

ANSWER *

$12 + (n-1)6 = 252 \Rightarrow n = 41$

Middle term is the 21^{st} term

$a_{21} = 12 + 20 \times 6 = 132$

Middle term = 132

Q58 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/5/1

How many 4-digit numbers are divisible by 7 ?

ANSWER *

4-digit multiples of 7: $1001,\ 1008,\ \ldots,\ 9996$; AP with $a = 1001,\ d = 7$

$9996 = 1001 + (n-1)7 \Rightarrow n - 1 = 1285$

$n = 1286$

1286

Q59 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/5/2

Find three consecutive terms in A.P. whose sum is 21 and their product is 231.

ANSWER *

Let the terms be $a-d,\ a,\ a+d$: $3a = 21 \Rightarrow a = 7$

$(7-d) \cdot 7 \cdot (7+d) = 231 \Rightarrow 49 - d^2 = 33 \Rightarrow d = \pm 4$

Terms: $3,\ 7,\ 11$ or $11,\ 7,\ 3$

$3,\ 7,\ 11$ (or $11,\ 7,\ 3$)

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q60 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/5/3

The 4^{th} and 10^{th} term of an A.P. are 13 and 25 respectively. Find its 24^{th} term.

ANSWER *

$a + 3d = 13,\ a + 9d = 25 \Rightarrow 6d = 12 \Rightarrow d = 2$

$a = 7$

$a_{24} = 7 + 23 \times 2 = 53$

$a_{24} = 53$

Q61 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/5/3

From 232 to 540, find the number of multiples of 3.

ANSWER *

Multiples of 3: $234,\ 237,\ \ldots,\ 540$; AP with $a = 234,\ d = 3$

$540 = 234 + (n-1)3 \Rightarrow n - 1 = 102$

$n = 103$

103

Q62 Long Answer · 5 marks · Internal choice (OR) part — **2024** – 430(B)/S

The 26^{th}, 11^{th} and the last term of an A.P. are 0, 3 and $-\frac{1}{5}$ respectively. Find the common difference and the number of terms of the A.P.

ANSWER

$a + 25d = 0$ and $a + 10d = 3$ — 1+1

Solving, $d = -\frac{1}{5}$ and $a = 5$ — 1

$a_n = a + (n-1)d \Rightarrow -\frac{1}{5} = 5 + (n-1)\left(-\frac{1}{5}\right)$ — 1

$\Rightarrow n = 27$ — 1

$d = -\frac{1}{5}$; **27 terms**

02 TOPIC 2 Sum of First n Terms

QUICK RECAP

- $S_n = \frac{n}{2}[2a + (n-1)d] = \frac{n}{2}(a + l)$, where l is the last term.
- $a_n = S_n - S_{n-1}$ (for $n \geq 2$) and $a_1 = S_1$. Sum of first n natural numbers $= \frac{n(n+1)}{2}$.

Q63 MCQ · 1 mark — **2023** – 430/2/2

The sum of the first 21 terms of an A.P. : $16,\ 12,\ 8,\ 4,\ \ldots$ is :

(A) -480 (B) -504
(C) 1176 (D) -484

ANSWER *

$S_{21} = \frac{21}{2}[32 + 20(-4)] = \frac{21}{2}(-48) = -504$

(B) -504

Q64 MCQ · 1 mark **2024** – 430/3/3

If in an A.P., $a = 2$ and $S_{10} = 335$, then its 10^{th} term is :

(A) 55 (B) 65
(C) 68 (D) 58

ANSWER *

$S_{10} = \frac{10}{2}(a + a_{10}) \Rightarrow 335 = 5(2 + a_{10}) \Rightarrow a_{10} = 65$

(B) 65

Q65 MCQ · 1 mark **2025** – 430/6/1, 430/6/2, 430/6/3

If the sum of first n terms of an A.P. is given by $S_n = \frac{n}{2}(3n + 1)$, then the first term of the A.P. is

(A) 2 (B) $\frac{3}{2}$
(C) 4 (D) $\frac{5}{2}$

ANSWER *

$a = S_1 = \frac{1}{2}(3 + 1) = 2$

(A) 2

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q66 MCQ · 1 mark **2026 (I)** – 430/4/1, 430/4/3

The sum of first n terms of an A.P. is $50\sqrt{2}$. If the first and the last terms are $\sqrt{2}$ and $19\sqrt{2}$ respectively, then the value of n is :

(A) 10 (B) 5
(C) 15 (D) 20

ANSWER *

$\frac{n}{2}(\sqrt{2} + 19\sqrt{2}) = 50\sqrt{2} \Rightarrow 10n = 50 \Rightarrow n = 5$

(B) 5

Q67 Very Short Answer · 2 marks Internal choice (OR) part **2022** – 430/6/1, 430/6/2

If the first term of an A.P. is 5, the n^{th} term is 40 and the sum of first n terms is 180, find the value of n.

ANSWER

$S_n = 180 \Rightarrow \frac{n}{2}(5 + 40) = 180$ 1

$\Rightarrow \frac{n}{2} \times 45 = 180 \Rightarrow n = 8$ 1

$n = 8$

Q68 Very Short Answer · 2 marks | Internal choice (OR) part | **2022** – 430/B/6

Find the sum of the first 15 multiples of 7.

ANSWER

$7,\ 14,\ 21,\ \ldots$ ½

$S_{15} = \frac{15}{2}(14 + 14 \times 7)$ 1

$= 840$ ½

840

Q69 Very Short Answer · 2 marks | Internal choice (OR) part | **2022** – 430/1/2, 430/1/3

In an AP, if $a = 50$, $d = -4$ and $S_n = 0$, then find the value of n.

ANSWER *

$\frac{n}{2}[100 + (n-1)(-4)] = 0 \Rightarrow 104 - 4n = 0$

$n = 26$

$n = 26$

Q70 Very Short Answer · 2 marks | Internal choice (OR) part | **2022** – 430/1/2, 430/1/3

Find the sum of the first twelve 2-digit multiples of 7, using an AP.

ANSWER *

$14,\ 21,\ \ldots; a_{12} = 14 + 11 \times 7 = 91$

$S_{12} = \frac{12}{2}(14 + 91) = 630$

630

AN EDUCATIONAL INSTITUTE

Q71 Very Short Answer · 2 marks | **2022** – 430/3/1, 430/3/2, 430/3/3

For an AP with common difference 6, the sum of first ten terms is same as four times the sum of first five terms. Determine the first term of the AP.

ANSWER *

$5(2a + 54) = 4 \times \frac{5}{2}(2a + 24)$

$10a + 270 = 20a + 240 \Rightarrow a = 3$

$a = 3$

Q72 Very Short Answer · 2 marks — **2023** – 430/5/1

Find the sum of the first 15 terms of the A.P. : $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}, \ldots$

ANSWER *

$d = \frac{1}{12} - \frac{1}{15} = \frac{1}{60}$

$S_{15} = \frac{15}{2}\left[\frac{2}{15} + \frac{14}{60}\right] = \frac{15}{2} \times \frac{22}{60} = \frac{11}{4}$

$\boxed{\frac{11}{4}}$

Q73 Very Short Answer · 2 marks — **2023** – 430/5/2

Find the sum of the first 20 terms of the A.P. : $\frac{2}{3}, 0, -\frac{2}{3}, -\frac{4}{3}, \ldots$

ANSWER *

$a = \frac{2}{3}, d = -\frac{2}{3}$

$S_{20} = 10\left[\frac{4}{3} + 19\left(-\frac{2}{3}\right)\right] = 10 \times \left(-\frac{34}{3}\right) = -\frac{340}{3}$

$\boxed{-\frac{340}{3}}$

Q74 Very Short Answer · 2 marks — **2023** – 430/5/3

Find the sum of the first 20 terms of the A.P. : $-\frac{29}{3}, -9, -\frac{25}{3}, -\frac{23}{3}, \ldots$

ANSWER *

$a = -\frac{29}{3}, d = \frac{2}{3}$

$S_{20} = 10\left[-\frac{58}{3} + 19 \times \frac{2}{3}\right] = 10 \times \left(-\frac{20}{3}\right) = -\frac{200}{3}$

$\boxed{-\frac{200}{3}}$

Q75 Very Short Answer · 2 marks — **2026 (I)** – 430(B)

The sum of first n terms of an A.P. is given by $S_n = 4n^2 - n$. Find the 25^{th} term of this A.P.

ANSWER *

$a_{25} = S_{25} - S_{24} = [4(625) - 25] - [4(576) - 24]$

$= 2475 - 2280 = 195$

$\boxed{a_{25} = 195}$

Q76 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (II)** – 430/8/2

Find the sum of first ten 2-digit numbers which are multiples of 7.

ANSWER

Two-digit numbers which are multiples of 7 are $14,\ 21,\ 28,\ \ldots,\ 77$

$S_{10} = \frac{10}{2}(14 + 77)$ — 1+½

$= 455$ — ½

455

Q77 Short Answer · 3 marks — **2022** – 430/4/1

Find the sum of first 16 terms of the A.P. whose n^{th} term is given by $a_n = 5n - 3$.

ANSWER *

$a_1 = 2, a_{16} = 77$

$S_{16} = \frac{16}{2}(2 + 77)$

$= 632$

$S_{16} = 632$

Q78 Short Answer · 3 marks — **2022** – 430/4/3

The sum of first n terms of an AP is given by $S_n = 3n^2 + 2n$. Find the AP.

ANSWER *

$a_1 = S_1 = 5$

$S_2 = 16 \Rightarrow a_2 = 11, d = 6$

AP: $5,\ 11,\ 17,\ \ldots$

$5,\ 11,\ 17,\ \ldots$

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q79 Short Answer · 3 marks — **2022** – 430/B/5

If the sum of the first 6 terms of an AP is 36 and that of the first 16 terms is 256, find the AP. Also, find the sum of its first 10 terms.

ANSWER *

$3(2a + 5d) = 36 \Rightarrow 2a + 5d = 12; 8(2a + 15d) = 256 \Rightarrow 2a + 15d = 32$

$d = 2,\ a = 1$; AP: $1,\ 3,\ 5,\ \ldots$

$S_{10} = 5(2 + 18) = 100$

$1,\ 3,\ 5,\ \ldots; S_{10} = 100$

Q80 Short Answer · 3 marks — **2024** – 430/1/1, 430/1/3

How many terms of the A.P. $27,\ 24,\ 21,\ \ldots$ must be taken so that their sum is 105 ? Which term of the A.P.

is zero ?

ANSWER *

$a = 27,\ d = -3$: $\frac{n}{2}[54 - 3(n-1)] = 105$

$\Rightarrow 3n^2 - 57n + 210 = 0 \Rightarrow n^2 - 19n + 70 = 0 \Rightarrow (n-5)(n-14) = 0$

$n = 5$ or $n = 14$ (both valid: the 6^{th} to 14^{th} terms add up to zero)

$a_n = 27 - 3(n-1) = 0 \Rightarrow n = 10$; the 10^{th} term is zero

$n = 5$ or $n = 14$; 10^{th} term is zero

Q81 Short Answer · 3 marks | Internal choice (OR) part | **2025** – 430/6/1, 430/6/2, 430/6/3

Find the A.P. whose third term is 16 and seventh term exceeds the fifth term by 12. Also, find the sum of first 29 terms of the A.P.

ANSWER *

$a_7 - a_5 = 2d = 12 \Rightarrow d = 6$

$a + 2d = 16 \Rightarrow a = 4$; AP: $4,\ 10,\ 16,\ 22,\ \ldots$

$S_{29} = \frac{29}{2}[8 + 28 \times 6] = \frac{29}{2} \times 176 = 2552$

AP: $4,\ 10,\ 16,\ \ldots$; $S_{29} = 2552$

Q82 Short Answer · 3 marks | Internal choice (OR) part | **2025** – 430/6/1, 430/6/2, 430/6/3

Find the sum of first 20 terms of an A.P. whose n^{th} term is given by $a_n = 5 + 2n$. Can 52 be a term of this A.P. ?

ANSWER *

$a_1 = 7, a_{20} = 45$

$S_{20} = \frac{20}{2}(7 + 45) = 520$

$5 + 2n = 52 \Rightarrow n = 23.5$, not a natural number; so 52 is not a term of the AP

$S_{20} = 520$; No

Q83 Short Answer · 3 marks | Internal choice (OR) part | **2026 (I)** – 430/5/1

In an A.P., it is given that $a = 2$, $d = 8$ and $S_n = 90$. Find the value of n.

ANSWER *

$\frac{n}{2}[4 + (n-1)8] = 90 \Rightarrow n(4n - 2) = 90$

$\Rightarrow 2n^2 - n - 45 = 0 \Rightarrow (2n + 9)(n - 5) = 0$

$n = 5$ ($n = -\frac{9}{2}$ rejected)

$n = 5$

Q84 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/5/2

How many terms of the A.P. $3,\ 5,\ 7,\ 9,\ \ldots$ must be added to get the sum 80 ?

ANSWER *

$a = 3,\ d = 2$: $\frac{n}{2}[6 + 2(n-1)] = 80 \Rightarrow n(n+2) = 80$

$n^2 + 2n - 80 = 0 \Rightarrow (n+10)(n-8) = 0$

$n = 8$ ($n = -10$ rejected)

8 terms

Q85 Short Answer · 3 marks — **2026 (II)** – 430(B)

The first and the last terms of an AP are -5 and 95 and the sum of all terms of the AP is 2295. Find the number of terms in the AP and the common difference.

ANSWER

$a = -5,\ a_n = 95$ and $S_n = 2295$; $S_n = 2295 = \frac{n}{2}(-5 + 95)$ — 1½

$n = 51$ — ½

Now, $a_n = 95 \Rightarrow -5 + 50d = 95$ — ½

$d = 2$ — ½

$n = 51, d = 2$

Q86 Long Answer · 5 marks · Internal choice (OR) part — **2023** – 430(B)

The sum of first 9 terms of an AP is 171 and the sum of its first 24 terms is 996. Find the 20^{th} term of the AP.

ANSWER *

$S_9 = \frac{9}{2}(2a + 8d) = 171 \Rightarrow a + 4d = 19$

$S_{24} = 12(2a + 23d) = 996 \Rightarrow 2a + 23d = 83$

Solving: $15d = 45 \Rightarrow d = 3,\ a = 7$

$a_{20} = 7 + 19 \times 3 = 64$

$a_{20} = 64$

Q87 Long Answer · 5 marks · Internal choice (OR) part — **2023** – 430/2/1

If the sum of the first 7 terms of an A.P. is -14 and that of 11 terms is -55, then find the sum of its first 'n' terms.

ANSWER *

$\frac{7}{2}(2a + 6d) = -14 \Rightarrow a + 3d = -2$

$\frac{11}{2}(2a + 10d) = -55 \Rightarrow a + 5d = -5$

$d = -\frac{3}{2},\ a = \frac{5}{2}$

$S_n = \frac{n}{2}\left[5 - \frac{3}{2}(n-1)\right] = \frac{n(13 - 3n)}{4}$

$S_n = \frac{n(13 - 3n)}{4}$

Q88 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/2/1

In an A.P., the sum of the first 'n' terms is $3n^2 + n$. Find the first term and the common difference of the A.P. Hence, find its 15^{th} term.

ANSWER *

$a = S_1 = 4$

$S_2 = 14 \Rightarrow a_2 = 10, d = 6$

$a_{15} = 4 + 14 \times 6 = 88$

$\boxed{a = 4,\ d = 6; a_{15} = 88}$

Q89 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/2/2

If the sum of the first 7 terms of an A.P. is -21 and that of the first 17 terms is -221, then find the sum of its first 'n' terms.

ANSWER *

$\frac{7}{2}(2a + 6d) = -21 \Rightarrow a + 3d = -3$

$\frac{17}{2}(2a + 16d) = -221 \Rightarrow a + 8d = -13$

$d = -2, a = 3$

$S_n = \frac{n}{2}[6 - 2(n-1)] = n(4 - n) = 4n - n^2$

$\boxed{S_n = 4n - n^2}$

Q90 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/2/3

The sum of the first 8 terms of an A.P. is 100 and the sum of its first 19 terms is 551. Find the sum of its first 'n' terms.

ANSWER *

$4(2a + 7d) = 100 \Rightarrow 2a + 7d = 25$

$\frac{19}{2}(2a + 18d) = 551 \Rightarrow a + 9d = 29$

$d = 3, a = 2$

$S_n = \frac{n}{2}[4 + 3(n-1)] = \frac{n(3n+1)}{2}$

$\boxed{S_n = \frac{n(3n+1)}{2}}$

Q91 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/2/3

If the sum of the first p terms of an A.P. is the same as the sum of its first q terms, $(p \neq q)$, then show that

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

the sum of its first $(p+q)$ terms is zero.

ANSWER *

$\frac{p}{2}[2a+(p-1)d] = \frac{q}{2}[2a+(q-1)d]$

$\Rightarrow 2a(p-q)+d[(p^2-q^2)-(p-q)] = 0 \Rightarrow (p-q)[2a+(p+q-1)d] = 0$

$p \neq q \Rightarrow 2a+(p+q-1)d = 0$

$S_{p+q} = \frac{p+q}{2}[2a+(p+q-1)d] = 0$

Q92 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/4/1

Find the sum of first 25 terms of the A.P. whose n^{th} term is given by $a_n = 5+6n$. Also, find the ratio of 20^{th} term to 45^{th} term.

ANSWER *

$a_1 = 11, a_{25} = 155$

$S_{25} = \frac{25}{2}(11+155) = 2075$

$a_{20} = 125, a_{45} = 275$

$a_{20} : a_{45} = 125 : 275 = 5 : 11$

$S_{25} = 2075; a_{20} : a_{45} = 5 : 11$

Q93 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/4/1

In an A.P., if $S_n = 3n^2+5n$ and $a_k = 164$, find the value of k.

ANSWER *

$a_n = S_n - S_{n-1} = 3n^2+5n-[3(n-1)^2+5(n-1)] = 6n+2$

$6k+2 = 164$

$k = 27$

$k = 27$

Q94 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/4/2

Find the sum of first 51 terms of an A.P. whose second and third terms are 14 and 18, respectively.

ANSWER *

$d = 18-14 = 4, a = 10$

$a_{51} = 10+50\times 4 = 210$

$S_{51} = \frac{51}{2}(10+210) = 5610$

$S_{51} = 5610$

Q95 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/4/2, 430/6/2

The first term of an A.P. is 5, the last term is 45 and the sum is 400. Find the number of terms and the

common difference.

ANSWER *

$\frac{n}{2}(5+45)=400 \Rightarrow n=16$

$45=5+15d \Rightarrow d=\frac{8}{3}$

$n=16, d=\frac{8}{3}$

Q96 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/4/3

The first term of an A.P. is -5 and the last term is 45. If the sum of all the terms of the A.P. is 120, find the number of terms and the common difference.

ANSWER *

$\frac{n}{2}(-5+45)=120 \Rightarrow n=6$

$45=-5+5d \Rightarrow d=10$

$n=6, d=10$

Q97 Long Answer · 5 marks | Internal choice (OR) part | **2023** – 430/4/3

If the sum of first 7 terms of an A.P. is 49 and that of first 17 terms is 289, find the sum of first n terms.

ANSWER *

$\frac{7}{2}(2a+6d)=49 \Rightarrow a+3d=7$

$\frac{17}{2}(2a+16d)=289 \Rightarrow a+8d=17$

$d=2, a=1$

$S_n=\frac{n}{2}[2+2(n-1)]=n^2$

$S_n=n^2$

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q98 Long Answer · 5 marks | **2023** – 430/6/1

The first term of an A.P. is 22, the last term is -6 and the sum of all the terms is 64. Find the number of terms of the A.P. Also, find the common difference.

ANSWER *

$\frac{n}{2}(22-6)=64$

$8n=64 \Rightarrow n=8$

$-6=22+7d$

$d=-4$

$n=8, d=-4$

Q99 Long Answer · 5 marks | **2023** – 430/6/3

The sum of the 4^{th} and 8^{th} term of an A.P. is 24 and the sum of the 6^{th} and 10^{th} term of the A.P. is 44. Find

the A.P. Also, find the sum of first 25 terms of the A.P.

ANSWER *

$2a + 10d = 24 \Rightarrow a + 5d = 12$

$2a + 14d = 44 \Rightarrow a + 7d = 22$

$d = 5,\ a = -13$; AP: $-13,\ -8,\ -3,\ \ldots$

$S_{25} = \frac{25}{2}[-26 + 24 \times 5] = 1175$

AP: $-13,\ -8,\ -3,\ \ldots$; $S_{25} = 1175$

Q100 Long Answer · 5 marks · Internal choice (OR) part — **2024** – 430(B)/S

Find the sum of all multiples of 9 lying between 300 and 700.

ANSWER

Multiples of 9 are $306,\ 315,\ \ldots,\ 693$ — 1

$a_n = 693 \Rightarrow 693 = 306 + (n-1) \times 9$ — 1

$\Rightarrow n = 44$ — ½

$\therefore\ S_n = \frac{n}{2}[a + l] = \frac{44}{2}(306 + 693)$ — 1½

$= 22 \times 999 = 21978$ — 1

21978

Q101 Long Answer · 5 marks — **2024** – 430/1/2

In an A.P., if $S_n = 4n^2 - n$, then (i) find the first term and common difference. (ii) write the A.P. (iii) which term of the A.P. is 107 ?

ANSWER *

$a = S_1 = 3;\ S_2 = 14 \Rightarrow a_2 = 11$

(i) $a = 3,\ d = 8$

(ii) AP: $3,\ 11,\ 19,\ 27,\ \ldots$

(iii) $3 + (n-1)8 = 107 \Rightarrow n - 1 = 13 \Rightarrow n = 14$

$a = 3,\ d = 8$; **AP:** $3,\ 11,\ 19,\ \ldots$; 14^{th} **term**

Q102 Long Answer · 5 marks — **2024** – 430/4/2

The second term of an A.P. is 29 and the fourth term is 51. If the last term of the A.P. is 425, find how many terms are there and what is their sum.

ANSWER *

$a + d = 29,\ a + 3d = 51 \Rightarrow d = 11,\ a = 18$

$18 + (n-1)11 = 425 \Rightarrow n - 1 = 37 \Rightarrow n = 38$

$S_{38} = \frac{38}{2}(18 + 425) = 19 \times 443 = 8417$

38 terms; sum $= 8417$

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q103 Long Answer · 5 marks **2024** – 430/4/3

If the sum of the first 7 terms of an A.P. is 91 and that of the first 17 terms is 561, then find the sum of the first n terms and hence find the n^{th} term.

ANSWER *

$\frac{7}{2}(2a+6d)=91 \Rightarrow a+3d=13$

$\frac{17}{2}(2a+16d)=561 \Rightarrow a+8d=33$

$d=4, a=1$

$S_n=\frac{n}{2}[2+4(n-1)]=2n^2-n$

$a_n=1+(n-1)4=4n-3$

$S_n=2n^2-n; a_n=4n-3$

Q104 Long Answer · 5 marks **2026 (I)** – 430/4/1, 430/4/2, 430/4/3

The third and ninth term of an A.P. are 4 and -8 respectively. (i) Which term of the A.P. is zero ? (ii) Find the value of n if $S_n=-36$.

ANSWER *

$a+2d=4, a+8d=-8 \Rightarrow 6d=-12 \Rightarrow d=-2, a=8$

(i) $8+(n-1)(-2)=0 \Rightarrow n=5$; the 5^{th} term is zero

(ii) $\frac{n}{2}[16+(n-1)(-2)]=-36 \Rightarrow n(9-n)=-36 \Rightarrow n^2-9n-36=0$

$(n-12)(n+3)=0 \Rightarrow n=12$ ($n=-3$ rejected)

(i) 5^{th} term (ii) $n=12$

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

03 TOPIC 3 Word Problems on AP

QUICK RECAP

- Identify a (first term) and d (fixed increase/decrease) from the situation, then use a_n for a particular term and S_n for a total.
- Number of terms is always a natural number; reject negative or fractional values of n.

Q105 Long Answer · 5 marks Internal choice (OR) part **2023** – 430/2/2

A man repays a loan of ₹ 3,250 by paying ₹ 20 in the first month and then increases the payment by ₹ 15 every month. How long will it take to clear the loan ?

ANSWER *

$a=20,\ d=15$: $\frac{n}{2}[40+15(n-1)]=3250$

$\Rightarrow 15n^2+25n-6500=0 \Rightarrow 3n^2+5n-1300=0$

$(n-20)(3n+65)=0$

$n=20$ months

20 months

Q106 Long Answer · 5 marks **2024** – 430/4/1

A manufacturer of TV sets produced 720 TV sets in the fourth year and 880 TV sets in the eighth year. Assuming that the production increases uniformly by a fixed number every year, find the production in the tenth year and the total production in the first seven years.

ANSWER *

$a + 3d = 720$, $a + 7d = 880$

$4d = 160 \Rightarrow d = 40$, $a = 600$

$a_{10} = 600 + 9 \times 40 = 960$

$S_7 = \frac{7}{2}[1200 + 6 \times 40] = \frac{7}{2} \times 1440 = 5040$

10^{th} year: 960 sets; first 7 years: 5040 sets

Q107 Case Study · 4 marks **2022** – 430/1/1, 430/1/2, 430/1/3

Case study: Do you know old clothes which are thrown as waste not only fill the landfill site but also produce very harmful greenhouse gas. So, it is very important that we reuse old clothes in whatever way we can. The picture given below on the right, shows a footmat (rug) made out of old t-shirts yarn. Observing the picture, you will notice that a number of stitches in circular rows are making a pattern : 6, 12, 18, 24, ...

(a) Check whether the given pattern forms an AP. If yes, find the common difference and the next term of the AP. **[2]**

(b) Write the n^{th} term of the AP. Hence, find the number of stitches in the 10^{th} circular row. **[2]**

ANSWER *

(a) $12 - 6 = 18 - 12 = 24 - 18 = 6$: it forms an AP with $d = 6$

Next term $= 30$

(b) $a_n = 6 + (n - 1)6 = 6n$

$a_{10} = 60$ stitches

Q108 Case Study · 4 marks **2023** – 430/C/1, 430/C/2, 430/C/3

Case study: A fashion designer is designing a fabric pattern. In each row, there are some shaded squares and unshaded triangles.

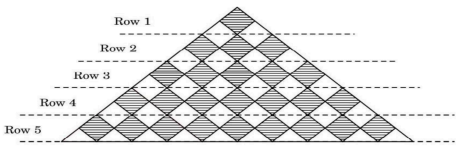
(i) Identify A.P. for the number of squares in each row. **[1]**

(ii) Identify A.P. for the number of triangles in each row. **[1]**

(iii) (a) If each shaded square is of side 2 cm, then find the shaded area when 15 rows have been designed. **[2]**

OR

(iii) (b) Write a formula for finding total number of triangles in 'n' number of rows. Hence, find S_{10}. **[2]**



ANSWER

(i) A.P. for the number of squares in each row is $1,\ 3,\ 5,\ 7,\ 9, \ldots$ — 1

(ii) A.P. for the number of triangles in each row is $2,\ 6,\ 10,\ 14, \ldots$ — 1

(iii)(a) Area of each square $= 2 \times 2 = 4\ \text{cm}^2$ — ½

Number of squares in 15 rows $= \frac{15}{2}(2 + 14 \times 2) = 225$ — 1

Shaded area $= 225 \times 4 = 900\ \text{cm}^2$ — ½

OR (iii)(b) $S_n = \frac{n}{2}[4 + (n-1)4] = 2n^2$ — 1

$\therefore\ S_{10} = 2 \times 10^2 = 200$ — 1

Q109 · Case Study · 4 marks · 2023 – 430/C/B

Case study: Nikhil started saving money for his new project. He started saving ₹ 240 in the first month, ₹ 300 in the second month, ₹ 360 in the third month and so on. He continues to save in this manner for quite some time.

(i) Are the numbers representing his savings in AP ? If so, write the first term (a) and the common difference (d). **[1]**

(ii) In which month will he save ₹ 660 ? **[1]**

(iii) (a) What amount will he save in the 15^{th} month ? **[2]**

OR

(iii) (b) How much money he will accumulate after 10 months ? **[2]**

ANSWER

(i) Yes these numbers are in AP — ½

First term, $a = 240$ and common difference, $d = 60$ — ½

(ii) $a_n = a + (n-1)d$: $660 = 240 + (n-1)60 \Rightarrow n = 8$; Nikhil will save ₹660 in the 8^{th} month — 1

(iii)(a) $a_{15} = a + 14d = 240 + (15-1) \times 60$ — 1½

$= 1080$; Nikhil will save ₹1080 in 15^{th} month — ½

OR (iii)(b) $S_n = \frac{n}{2}(2a + (n-1)d)$; $S_{10} = 5(2 \times 240 + (10-1) \times 60)$ — 1½

$= 5100$; Nikhil will save ₹5100 in 10 months — ½

Q110 · Case Study · 4 marks · 2024 – 430/2/1, 430/2/2, 430/2/3

Saving money is a good habit and it should be inculcated in children right from the beginning. Rehan's mother brought a piggy bank for Rehan and puts one ₹ 5 coin of her savings in the piggy bank on the first day. She increases her savings by one ₹ 5 coin daily.

Based on the above information, answer the following questions :

(i) How many coins were added to the piggy bank on 8^{th} day ? (1)

(ii) How much money will be there in the piggy bank after 8 days ? (1)

(iii) (a) If the piggy bank can hold one hundred twenty ₹ 5 coins in all, find the number of days she can contribute to put ₹ 5 coins into it. (2)

OR
(iii) (b) Find the total money saved, when the piggy bank is full. (2)

ANSWER *

Coins added: $1,\ 2,\ 3,\ \ldots$ (AP with $a = 1,\ d = 1$)

(i) $a_8 = 8$ coins

(ii) $S_8 = \frac{8}{2}(1 + 8) = 36$ coins $= 36 \times 5 = ₹\ 180$

(iii)(a) $\frac{n(n+1)}{2} = 120 \Rightarrow n^2 + n - 240 = 0 \Rightarrow (n + 16)(n - 15) = 0 \Rightarrow n = 15$ days

OR (iii)(b) 120 coins $\times$ ₹ 5 = ₹ 600

(i) 8 coins (ii) ₹ 180 (iii)(a) 15 days OR (iii)(b) ₹ 600

Q111 Case Study · 4 marks **2024** – 430/3/2, 430/3/3

While preparing for a competitive examination, Akbar came across a match-stick pattern based question. The pattern is given below :

Based on the above information, answer the following questions :

(i) Write first term and common difference of the A.P. formed by number of squares in each figure. (1)

(ii) Write first term and common difference of the A.P. formed by number of sticks used in each figure. (1)

(iii) (a) How many squares are there in Fig. (10) ? Also, write the number of sticks used in Fig. (10). (2)

OR

(iii) (b) If 88 sticks are used to make m^{th} figure (Fig. (m)), find the value of m. How many squares are formed in this figure ? (2)

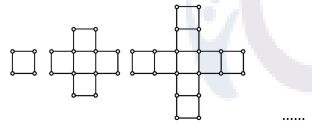


Fig. (1) Fig. (2) Fig. (3) .....

ANSWER *

(i) Squares: $1,\ 5,\ 9,\ \ldots$; $a = 1,\ d = 4$

(ii) Sticks: $4,\ 16,\ 28,\ \ldots$; $a = 4,\ d = 12$

(iii)(a) Squares in Fig. (10) $= 1 + 9 \times 4 = 37$; sticks $= 4 + 9 \times 12 = 112$

OR (iii)(b) $4 + (m - 1)12 = 88 \Rightarrow m - 1 = 7 \Rightarrow m = 8$; squares $= 1 + 7 \times 4 = 29$

(i) $a = 1,\ d = 4$ (ii) $a = 4,\ d = 12$ (iii)(a) 37 squares, 112 sticks OR (iii)(b) $m = 8$, 29 squares

Q112 Case Study · 4 marks **2024** – 430/5/1, 430/5/2

Sumant's mother started a new shoe shop. To display the shoes, she put 3 pairs of shoes in the 1^{st} row, 5 pairs in the 2^{nd} row, 7 pairs in the 3^{rd} row and so on.

Based on the above information, answer the following questions :

(i) How many pairs of shoes are displayed in the 6^{th} row ? (1)

(ii) What is the difference of pairs of shoes in the 1^{st} row and the 6^{th} row ? (1)

(iii) (a) Find the total number of pairs of shoes displayed in the first 15 rows. (2)

OR

(iii) (b) If the pairs of shoes displayed in the 4^{th} row are 'on sale' at price of ₹ 500 for each pair, then find the total amount (money) earned by Sumant's mother if all shoes displayed in the 4^{th} row are sold out. (2)

ANSWER *

AP: $3,\ 5,\ 7,\ \ldots$; $a = 3,\ d = 2$

(i) $a_6 = 3 + 5 \times 2 = 13$

(ii) $a_6 - a_1 = 13 - 3 = 10$

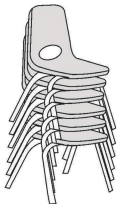
(iii)(a) $S_{15} = \frac{15}{2}[6 + 14 \times 2] = \frac{15}{2} \times 34 = 255$

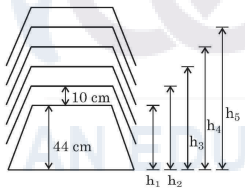
OR (iii)(b) $a_4 = 9$ pairs; amount $= 9 \times 500 =$ ₹ 4500

(i) 13 (ii) 10 (iii)(a) 255 OR (iii)(b) ₹ 4500

Q113 Case Study · 4 marks **2025** – 430/5/1, 430/5/2, 430/5/3

A tent house owner provides furniture on rent. He stacks chairs in his shop to save space.
In the diagram, the height of seat of chair from ground is represented by $h_1,\ h_2,\ h_3,\ \ldots$. The height of first seat is 44 cm from ground level and gap between every two seats is 10 cm.
(i) Write the values of $h_1,\ h_2,\ h_3,\ h_4$ and h_5 in this order only. (1)
(ii) Show that the above values form an A.P. Write its first term and common difference. (1)
(iii) (a) If chairs can be stacked up to the maximum height of 160 cm, then find the maximum number of chairs in a stack. (2)
OR
(iii) (b) Is it possible to stack 15 chairs if maximum height of the stack can not be more than 180 cm ? Justify your answer. (2)





INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

ANSWER *

(i) $h_1 = 44,\ h_2 = 54,\ h_3 = 64,\ h_4 = 74,\ h_5 = 84$ (cm)

(ii) $h_2 - h_1 = h_3 - h_2 = \cdots = 10$ (constant), so they form an AP with $a = 44,\ d = 10$

(iii)(a) $44 + (n-1)10 \le 160 \Rightarrow n - 1 \le 11.6 \Rightarrow n \le 12.6$; maximum 12 chairs

OR (iii)(b) $h_{15} = 44 + 14 \times 10 = 184$ cm > 180 cm; so 15 chairs cannot be stacked

(i) 44, 54, 64, 74, 84 (ii) $a = 44,\ d = 10$ (iii)(a) 12 chairs OR (iii)(b) No, $h_{15} = 184$ cm > 180 cm

Q114 Case Study · 4 marks **2025** – 430/2/1, 430/2/2, 430/2/3

A woman borrowed ₹ 10,00,000 from her friend and promised to return the borrowed money in monthly instalments beginning from the next month. After one month, she returned ₹ 10,000, the next month she returned ₹ 15,000, the third month she returned ₹ 20,000 and so on, thereby increasing the monthly instalment uniformly.
Based on the above information, answer the following questions :
(i) Find the amount of instalment paid in the tenth month. (1)
(ii) In which instalment did she pay ₹ 40,000 ? (1)
(iii) (a) If she returned ₹ 11,50,000 in all, how many instalments did she pay ? (2)

OR
(iii) (b) By which instalment has she returned a total amount of ₹ 3,25,000 ? (2)

ANSWER *

AP: $10000,\ 15000,\ 20000,\ \ldots$; $a = 10000,\ d = 5000$

(i) $a_{10} = 10000 + 9 \times 5000 =$ ₹ 55,000

(ii) $10000 + (n-1)5000 = 40000 \Rightarrow n - 1 = 6 \Rightarrow n = 7$

(iii)(a) $\frac{n}{2}[20000 + (n-1)5000] = 1150000 \Rightarrow n^2 + 3n - 460 = 0 \Rightarrow (n+23)(n-20) = 0 \Rightarrow n = 20$

OR (iii)(b) $\frac{n}{2}[20000 + (n-1)5000] = 325000 \Rightarrow n^2 + 3n - 130 = 0 \Rightarrow (n+13)(n-10) = 0 \Rightarrow n = 10$

(i) ₹ 55,000 (ii) 7^{th} (iii)(a) 20 instalments OR (iii)(b) 10^{th} instalment

Q115 Case Study · 4 marks **2025** – 430/3/1, 430/3/2, 430/3/3

In a society, a yoga instructor was hired to train the people of the society to live a healthy lifestyle. Yoga sessions were held daily from 5 p.m. to 7 p.m. in the society park. On day one, 5 people joined the yoga session, on day two, 3 more people joined, on day three, another 3 people joined and in this manner every next day, 3 more people kept on joining.
Based on the given information, answer the following questions :
(i) On which day did 59 people join the yoga session ? (1)
(ii) How many people joined the yoga session on the 31^{st} day ? (1)
(iii) (a) The yoga instructor was paid ₹ 100 for each person attending the yoga session. On which day would he earn ₹ 5,000 ? (2)
OR
(iii) (b) What was the total amount earned by the yoga instructor in 16 days ? (2)

ANSWER *

People in the session: $5,\ 8,\ 11,\ \ldots$; AP with $a = 5,\ d = 3$

(i) $5 + (n-1)3 = 59 \Rightarrow n - 1 = 18 \Rightarrow n = 19$

(ii) $a_{31} = 5 + 30 \times 3 = 95$

(iii)(a) ₹ $5000 \div$ ₹ $100 = 50$ people; $5 + (n-1)3 = 50 \Rightarrow n = 16$

OR (iii)(b) $S_{16} = \frac{16}{2}[10 + 15 \times 3] = 440$ people; amount $= 440 \times 100 =$ ₹ 44,000

(i) 19^{th} day (ii) 95 (iii)(a) 16^{th} day OR (iii)(b) ₹ 44,000

Q116 Case Study · 4 marks **2026 (I)** – 430(B)

The best athlete of your school wants to participate in a 300 m. race in a state championship. Presently he can run that distance in 60 seconds but is confident that with each day of practice it will take him 3 seconds less than the previous day. So, first day he will take 60 seconds, 2^{nd} day 57 seconds, third day 54 seconds and so on, to complete the race. He wants to do it in 30 seconds.
Based on the above, answer the following questions :
(i) Write the first five terms of time and show that it forms an A.P.
(ii) How much time he will take on 6^{th} day to complete the race ?
(iii) (a) On which day he will be able to achieve his target of 30 seconds ?
OR

(iii) (b) If he devotes more time in practice and that may take him 3.2 seconds less than the previous day in completing the race, then on which day he will be able to complete the race in 28 seconds ?

ANSWER *

(i) $60,\ 57,\ 54,\ 51,\ 48$; difference between consecutive terms is -3 (constant), so it is an AP with $a = 60,\ d = -3$

(ii) $a_6 = 60 + 5(-3) = 45$ seconds

(iii)(a) $60 + (n-1)(-3) = 30 \Rightarrow n - 1 = 10 \Rightarrow n = 11$

OR (iii)(b) $60 + (n-1)(-3.2) = 28 \Rightarrow n - 1 = 10 \Rightarrow n = 11$

(ii) 45 seconds (iii)(a) 11^{th} day OR (iii)(b) 11^{th} day

Q117 Case Study · 4 marks — **2026 (II)** – 430/7/1, 430/7/2, 430/7/3

Case study: A foldable ladder has ten steps. In folded position (Position I), the distance between every two consecutive steps is 6 cm, whereas in extended position (Position II) this distance becomes 30 cm. The height of the first step from the ground is 40 cm. When measured, the heights of different steps from the ground, taken in order, form an AP.

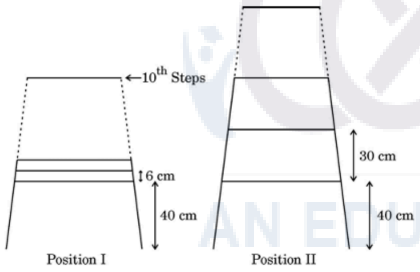
(i) Write the AP when the ladder is standing in Position I. **[1]**

(ii) Write the AP when the ladder is standing in Position II. **[1]**

(iii) (a) Write the total height of the ladder in both the situations. **[2]**

OR

(iii) (b) What would be the height of the ladder when the ladder is opened till the seventh step only ? **[2]**



ANSWER

(i) A.P. formed is $40,\ 46,\ 52,\ 58, \ldots$ — 1

(ii) A.P. formed is $40,\ 70,\ 100,\ 130, \ldots$ — 1

(iii)(a) In position I: total height $= a_{10} = 40 + 9 \times 6 = 94$ cm — 1

In position II: total height $= a_{10} = 40 + 9 \times 30 = 310$ cm — 1

OR (iii)(b) Height of the ladder till 7^{th} step $= 40 + 6 \times 30 = 220$ — 1½

Total height $= 220 + 18 = 238$ cm — ½

Q118 Case Study · 4 marks — **2026 (II)** – 430(B)

Case study: Yogesh started saving money for his new project. He started saving ₹ 200 in the first month, ₹ 250 in the second month, ₹ 300 in the third month and so on. He continues to save in this manner for quite some time.

(i) Show that the pattern of savings followed by him forms an AP. **[1]**

(ii) In which month would he save ₹ 1,000 ? **[1]**

(iii) (a) Determine the total amount saved in the first 20 months. **[2]**

OR

(iii) (b) How many months will he take to save a total amount of ₹ 21,450 ? **[2]**

ANSWER

(i) $200,\ 250,\ 300, \ldots$ form an A.P., with $d = 50$ — 1

(ii) $a_n = 200 + (n-1)50 = 1000 \Rightarrow n = 17$; in 17^{th} month, he would save ₹1,000 — 1

(iii)(a) $S_{20} = \frac{20}{2}(2 \times 200 + 19 \times 50)$ — 1

Total amount saved in the first 20 months $=$ ₹13,500 — 1

OR (iii)(b) $S_n = 21450$: $\frac{n}{2}(2 \times 200 + (n-1) \times 50) = 21450 \Rightarrow n^2 + 7n - 858 = 0$ — 1

$n = 26,\ -33$ (rejected); Yogesh will take 26 months — 1

AN EDUCATIONAL INSTITUTE

MIND CURVE · INFINITY THINK BEYOND

Pre-Booster Test Series 2026–27

Class X · Mathematics Standard & Basic

Done with the PYQs? Put them to work. The **Mind Curve Pre-Booster Test Series 2026–27** gives Class X students chapter-wise and full-syllabus tests in the latest CBSE pattern, so every topic you practised here is tested again before the board exam.

Join the Test Series: infinitythinkbeyond.co.in/mind-curve-class-x-test-series-2026-27

MIND CURVE – THE MATHEMATICS FORUM

An open forum where Mathematics **students and teachers** learn together: free resources, chapter-wise practice material, test series and doubt discussions, all in one growing community of Maths learners.

WhatsApp Group: chat.whatsapp.com/ICdBeP9GNOd4hOdZxC6C5W

INFINITY THINK BEYOND – WEBSITE

Mathematics help for **students** (notes, PYQs, worksheets, sample papers) and for **teachers** (ready test papers, answer keys and teaching resources), built around conceptual learning.

Website: www.infinitythinkbeyond.co.in

REFERENCES

Questions: CBSE Previous Year Question Papers – www.cbse.gov.in/cbsenew/question-paper.html

Answers: CBSE Marking Schemes – www.cbse.gov.in/cbsenew/marking-scheme.html