# PYQSide

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## JEE MAIN SEQUENCES AND SERIES — ARITHMETIC PROGRESSION AND ARITHMETIC MEAN — PYQS

**Max. Marks:** 68 **Questions:** 17

### Section A (MCQ) — 16 questions

**Q.1** Let $\alpha = 3 + 4 + 8 + 9 + 13 + 14 + \ldots$ upto 40 terms. If $(\tan\beta)^{\frac{\alpha}{1020}}$ is a root of the equation $x^2 + x - 2 = 0$, $\beta \in \left(0, \frac{\pi}{2}\right)$, then $\sin^2\beta + 3\cos^2\beta$ is equal to :

[JEE Main 2026 (Online) 8th April Evening Shift]

(1) 2 (2) $\frac{7}{4}$ (3) $\frac{5}{2}$ (4) $\frac{3}{2}$

Scan or tap for the full solution

**Q.2** Let the sum of the first n terms of an A.P. be $3n^2 + 5n$. Then the sum of squares of the first 10 terms of the A.P. is:

[JEE Main 2026 (Online) 5th April Morning Shift]

(1) 10220 (2) 12860 (3) 15220 (4) 19780

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**Q.3** Let $A_1, A_2, A_3, \ldots, A_{39}$ be 39 arithmetic means between the numbers 59 and 159. Then the mean of $A_{25}, A_{28}, A_{31}$ and $A_{36}$ is equal to :

[JEE Main 2026 (Online) 5th April Evening Shift]

(1) 129 (2) 136 (3) 131.50 (4) 134

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**Q.4** The first term of an A.P. of 30 non-negative terms is $\frac{10}{3}$. If the sum of this A.P. is the cube of its last term, then its common difference is:

[JEE Main 2026 (Online) 4th April Morning Shift]

(1) $\frac{5}{87}$ (2) $\frac{25}{83}$ (3) $\frac{15}{29}$ (4) $\frac{5}{29}$

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**Q.5** Let A be the set of first 101 terms of an A.P., whose first term is 1 and the common difference is 5 and let B be the set of first 71 terms of an A.P., whose first term is 9 and the common difference is 7. Then the number of elements in $A \cap B$, which are divisible by 3, is :

[JEE Main 2026 (Online) 2nd April Morning Shift]

(1) 4 (2) 5 (3) 6 (4) 7

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**Q.6** The common difference of the A.P.: $a_1, a_2, \ldots, a_m$ is 13 more than the common difference of the A.P.: $b_1, b_2, \ldots, b_n$. If $b_{31} = -277$, $b_{43} = -385$ and $a_{78} = 327$, then $a_1$ is equal to

[JEE Main 2026 (Online) 28th January Morning Shift]

(1) 21 (2) 19 (3) 24 (4) 16

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**Q.7** Consider an A.P.: $a_1, a_2, \ldots, a_n$; $a_1 > 0$. If $a_2 - a_1 = \frac{-3}{4}$, $a_n = \frac{1}{4}a_1$, and $\sum_{i=1}^{n} a_i = \frac{525}{2}$, then $\sum_{i=1}^{17} a_i$ is equal to

[JEE Main 2026 (Online) 24th January Morning Shift]

(1) 238 (2) 136 (3) 476 (4) 952

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**Q.8** Let $a_1, a_2, a_3, a_4$ be an A.P. of four terms such that each term of the A.P. and its common difference l are integers. If $a_1 + a_2 + a_3 + a_4 = 48$ and $a_1a_2a_3a_4 + l^4 = 361$, then the largest term of the A.P. is equal to

[JEE Main 2026 (Online) 24th January Evening Shift]

(1) 27 (2) 24 (3) 23 (4) 21

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**Q.9** Let $\sum_{k=1}^{n} a_k = \alpha n^2 + \beta n$. If $a_{10} = 59$ and $a_6 = 7a_1$, then $\alpha + \beta$ is equal to :

[JEE Main 2026 (Online) 23rd January Evening Shift]

(1) 3 (2) 5 (3) 7 (4) 12

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**Q.10** If the sum of the first four terms of an A.P. is 6 and the sum of its first six terms is 4, then the sum of its first twelve terms is

[JEE Main 2026 (Online) 22nd January Morning Shift]

(1) −26 (2) −20 (3) −24 (4) −22

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**Q.11** Let $a_n$ be the $n^{th}$ term of an A.P. If $S_n = a_1 + a_2 + a_3 + \ldots + a_n = 700$, $a_6 = 7$ and $S_7 = 7$, then $a_n$ is equal to : [JEE Main 2025 (Online) 7th April Evening Shift]

(1) 65 (2) 56 (3) 70 (4) 64

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**Q.12** Consider two sets A and B, each containing three numbers in A.P. Let the sum and the product of the elements of A be 36 and p respectively and the sum and the product of the elements of B be 36 and q respectively. Let d and D be the common differences of A.P.'s in A and B respectively such that D = d + 3, d > 0. If $\frac{p+q}{p-q} = \frac{19}{5}$, then p − q is equal to [JEE Main 2025 (Online) 4th April Evening Shift]

(1) 540 (2) 450 (3) 600 (4) 630

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**Q.13** Let $a_1, a_2, a_3, \ldots$ be in an A.P. such that $\sum_{k=1}^{12} a_{2k-1} = -\frac{72}{5}a_1$, $a_1 \neq 0$. If $\sum_{k=1}^{n} a_k = 0$, then n is : [JEE Main 2025 (Online) 2nd April Morning Shift]

(1) 18 (2) 17 (3) 11 (4) 10

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**Q.14** The number of terms of an A.P. is even; the sum of all the odd terms is 24, the sum of all the even terms is 30 and the last term exceeds the first by $\frac{21}{2}$. Then the number of terms which are integers in the A.P. is : [JEE Main 2025 (Online) 2nd April Evening Shift]

(1) 6 (2) 4 (3) 8 (4) 10

Scan or tap for the full solution

**Q.15** Consider an A. P. of positive integers, whose sum of the first three terms is 54 and the sum of the first twenty terms lies between 1600 and 1800. Then its $11^{th}$ term is : [JEE Main 2025 (Online) 29th January Morning Shift]

(1) 108 (2) 90 (3) 122 (4) 84

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**Q.16** Let $T_r$ be the $r^{th}$ term of an A.P. If for some m, $T_m = \frac{1}{25}$, $T_{25} = \frac{1}{20}$, and $20\sum_{r=1}^{25} T_r = 13$, then $5m\sum_{r=m}^{2m} T_r$ is equal to [JEE Main 2025 (Online) 28th January Morning Shift]

(1) 98 (2) 126 (3) 112 (4) 142

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## Section B (Numerical) — 1 question

**Q.17** The interior angles of a polygon with n sides are in an A.P. with common difference 6°. If the largest interior angle of the polygon is 219°, then n is equal to _____. [JEE Main 2025 (Online) 28th January Evening Shift]

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## ANSWER KEY

### Section A (MCQ) — 16 questions

| Ques. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ans.** | **1** | **3** | **4** | **1** | **2** | **2** | **1** | **1** | **2** | **4** | **4** |
| **Ques.** | 12 | 13 | 14 | 15 | 16 | | | | | | |
| **Ans.** | **1** | **3** | **2** | **2** | **2** | | | | | | |

### Section B (Numerical) — 1 question

| Ques. | 17 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ans.** | **20** | | | | | | | | | | |