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MATHEMATICS · JEE MAIN

Sequences & Series

Previous Year Questions with answers

333 questions · **190** papers · **2002–2026** · newest paper first

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What is in this PDF: every Sequences & Series question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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Chapter at a glance

5.7%
of Mathematics questions, 2019–2026

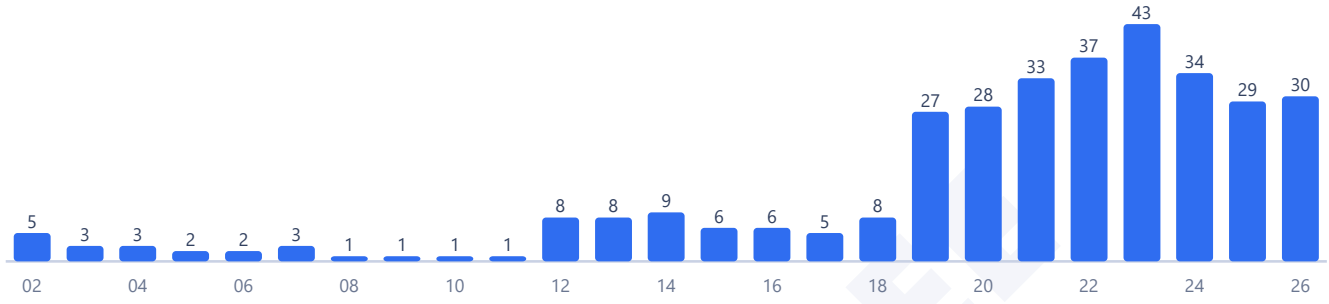
333
questions, 2002–2026

153 of 162
papers asked it, 2019–2026

254 / 79
MCQ / numerical, 2002–2026

Trend. Steady: 1.6 questions per paper in 2024–2026 against 1.6 in 2019–2023.

Questions per year



Counts are the questions we hold: 333 in 190 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2002–2026)

Special Series	131
Arithmetic Progression	102
Geometric Progression	87
HP & Means	13

How often it comes up

Sequences and series is a foundational algebra domain under Unit 6: Sequence and Series in the Class 11 curriculum, placing it at rank 3 among the 29 chapters in the subject. With 261 questions catalogued across 162 papers between 2019 and 2026, it represents 5.7 percent of all mathematics questions. It appeared in 153 of those papers and has surfaced every year since 2019. In the more recent 2024 to 2026 test cycles, it accounted for 93 problems across 58 papers, maintaining an average of 1.6 questions per paper and capturing a 6.0 percent subject share. Compared with its 5.5 percent share during the 2002 to 2018 window, its recent share is up, while comparing 2019 to 2026 against 2024 to 2026 shows it is about the same. Across the entire 2002 to 2026 archive of 200 papers, 333 questions appear across 190 shifts. Among the 2019 to 2026 questions, 79 were numerical answer questions.

Students can expect around one to two problems on progressions in nearly every examination shift. During 2024, 2025, and 2026, the question counts stood at 34, 29, and 30 questions respectively, confirming that the examiner considers this chapter a staple component of the algebra paper.

Because sequences can be combined seamlessly with quadratics, binomial coefficients, and limits, questions frequently serve as bridge problems between distinct syllabus areas. Numerical response sections regularly feature progression problems, demanding methodical calculation to avoid computational slips.

Most-asked topics

Questions distribute across three primary conceptual clusters:

1. **Special Series (104 questions, 2019-2026; 131 total, last asked 2026)** The single most frequent topic involves finding sums of finite and infinite series using sigma notation, difference methods, splitting into partial fractions, and telescoping cancellations. Many problems require rewriting the general term to cancel consecutive terms across summation limits.

2. **Arithmetic Progression (80 questions, 2019-2026; 102 total, last asked 2026)** Standard AP problems involve common differences, relations between partial sums, insertion of arithmetic means, and simultaneous constraints on terms. Problems frequently ask for specific partial sums or determine common elements between two distinct arithmetic sequences.

3. **Geometric Progression (70 questions, 2019-2026; 87 total, last asked 2026)** Focuses on general terms, properties of terms equidistant from extremities, infinite geometric series convergence, and products of consecutive terms. Questions regularly combine arithmetic and geometric properties in mixed systems.

4. **HP & Means (7 questions, 2019-2026; 13 total, last asked 2023)** Deals with harmonic progressions and relationships between arithmetic, geometric, and harmonic means. With harmonic progressions trimmed from the latest syllabus, questions directly dedicated to HP have largely subsided.

What the questions look like

Most progression questions in JEE Main follow structured patterns:

- **Telescoping Summations**: You are given a fractional or radical algebraic term whose denominator features products of consecutive factors. Decomposing the general term into differences causes intermediate terms to drop out entirely.
- **Combined AP and GP Systems**: Three numbers form an arithmetic progression, but shifting or squaring certain terms produces a geometric progression. Solving the resulting system of polynomial equations yields the individual terms.
- **Identities Involving Partial Sums**: Formulations equate partial sums across different indices, such as relations connecting the sums of four terms and six terms to uncover the twelfth sum.
- **Common Terms in Overlapping Progressions**: You must find the number of identical terms shared by two arithmetic progressions within a specified numerical ceiling by evaluating the least common multiple of their common differences.

How to practise it

Mastering sequences requires rigorous algebraic speed alongside pattern identification:

- **Express the general term first**: When inspecting an unfamiliar series, write down the nth term explicitly in simplified algebraic form. Verify that substituting small index values yields the opening terms of the given expression.
- **Inspect for telescoping differences**: If denominators consist of factor products or surd sums, multiply by conjugate factors or split via partial fractions to convert each term into a difference of adjacent evaluation steps.
- **Utilise standard summation formulas**: Memorise the closed-form identities for the sums of the first n natural numbers, their squares, and their cubes. When polynomials appear inside sigma sums, expand them and apply these identities directly.
- **Handle common terms methodically**: To locate matching terms between two arithmetic progressions, identify the very first common value by inspection, then compute the common difference of the merged progression as the least common multiple of both individual common differences.

Q1 JEE Main 2026 · 8 Apr · Shift 2 MCQ

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 :

(A) 2
(B) $\frac{7}{4}$
(C) $\frac{5}{2}$
(D) $\frac{3}{2}$

Answer: (A) 2 · Official NTA final key

Q2 JEE Main 2026 · 6 Apr · Shift 1 MCQ

The value of $1^3 - 2^3 + 3^3 - \ldots + 15^3$ is:

(A) 1706
(B) 1856
(C) 1982
(D) 2403

Answer: (B) 1856 · Official NTA final key

Q3 JEE Main 2026 · 6 Apr · Shift 1 MCQ

The sum of the first ten terms of an A.P. is 160 and the sum of the first two terms of a G.P. is 8. If the first term of the A.P. is equal to the common ratio of the G.P. and the first term of the G.P. is equal to common difference of the A.P., then the sum of all possible values of the first term of the G.P. is:

(A) $\frac{34}{9}$
(B) $\frac{34}{13}$
(C) $\frac{32}{9}$
(D) $\frac{32}{13}$

Answer: (A) $\frac{34}{9}$ · Official NTA final key

Q4 JEE Main 2026 · 6 Apr · Shift 2 MCQ

The sum $1 + \frac{1}{2}\left(1^2 + 2^2\right) + \frac{1}{3}\left(1^2 + 2^2 + 3^2\right) + \ldots$ upto 10 terms is equal to :

(A) 130
(B) 155
(C) $\frac{315}{2}$
(D) $\frac{325}{2}$

Answer: (C) $\frac{315}{2}$ · Official NTA final key

Q5 JEE Main 2026 · 5 Apr · Shift 1 MCQ

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:

(A) 10220
(B) 12860
(C) 15220
(D) 19780

Answer: (C) 15220 · Official NTA final key

Q6 JEE Main 2026 · 5 Apr · Shift 1 MCQ

$\sum_{n=1}^{10}\left(\frac{528}{n(n+1)(n+2)}\right)$ is equal to:

(A) 65
(B) 130
(C) 220
(D) 440

Answer: (B) 130 · Official NTA final key

Q7 JEE Main 2026 · 5 Apr · Shift 2 MCQ

If the sum of the first 10 terms of the series $\frac{1}{1+1^4\times4}+\frac{2}{1+2^4\times4}+\frac{3}{1+3^4\times4}+\frac{4}{1+4^4\times4}+\ldots\ldots$ is $\frac{m}{n}$, gcd (m, n) = 1, then m + n is equal to :

(A) 256
(B) 264
(C) 276
(D) 284

Answer: (C) 276 · Official NTA final key

Q8 JEE Main 2026 · 5 Apr · Shift 2 MCQ

Let $A_1, A_2, A_3, \ldots\ldots, A_{39}$ 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 :

(A) 129
(B) 136
(C) 131.50
(D) 134

Answer: (D) 134 · Official NTA final key

Q9 JEE Main 2026 · 4 Apr · Shift 1 MCQ

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:

(A) $\frac{5}{87}$
(B) $\frac{25}{83}$
(C) $\frac{15}{29}$
(D) $\frac{5}{29}$

Answer: (A) $\frac{5}{87}$ · Official NTA final key

Q10 JEE Main 2026 · 4 Apr · Shift 2 MCQ

Let $\alpha = \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \ldots\infty$ and $\beta = \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \ldots\infty$. Then the value of $(0.2)^{\log_{\sqrt{5}}(\alpha)} + (0.04)^{\log_5(\beta)}$ is equal to:

(A) 4
(B) 5
(C) 8
(D) 25

Answer: (C) 8 · Official NTA final key

Q11 JEE Main 2026 · 2 Apr · Shift 1 MCQ

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 :

(A) 4
(B) 5
(C) 6
(D) 7

Answer: (B) 5 · Official NTA final key

Q12 JEE Main 2026 · 2 Apr · Shift 1 Numerical

If $\sum_{k=1}^{n} a_k = 6n^3$, then $\sum_{k=1}^{6} \left(\frac{a_{k+1}-a_k}{36}\right)^2$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 91. · Official NTA final key

Q13 JEE Main 2026 · 2 Apr · Shift 2 MCQ

Let $a_1, a_2, a_3, \ldots\ldots$ be an A.P. and $g_1 = a_1, g_2, g_3, \ldots\ldots$ be an increasing G.P. If $a_1 = a_2 + g_2 = 1$ and $a_3 + g_3 = 4$, then $a_{10} + g_5$ is equal to :

(A) 81
(B) 76
(C) 62
(D) 55

Answer: (D) 55 · Official NTA final key

Q14 JEE Main 2026 · 2 Apr · Shift 2 MCQ

The sum $\frac{1^3}{1} + \frac{1^3+2^3}{1+3} + \frac{1^3+2^3+3^3}{1+3+5} + \ldots$ up to 8 terms, is :

(A) 70
(B) 71
(C) 72
(D) 73

Answer: (B) 71 · Official NTA final key

Q15 JEE Main 2026 · 28 Jan · Shift 1 MCQ

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

(A) 16
(B) 19
(C) 24
(D) 21

Answer: (B) 19 · Official NTA final key

Q16 JEE Main 2026 · 28 Jan · Shift 1 MCQ

The value of $\sum_{k=1}^{\infty}(-1)^{k+1}\left(\frac{k(k+1)}{k!}\right)$ is

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(A) $1/e$
(B) $2/e$
(C) $\sqrt{e}$
(D) $e/2$

Answer: (A) $1/e$ · Official NTA final key

Q17 JEE Main 2026 · 28 Jan · Shift 1 · Numerical

In a G.P., if the product of the first three terms is 27 and the set of all possible values for the sum of its first three terms is $\mathbf{R} - (a, b)$, then $a^2 + b^2$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 90. · Official NTA final key

Q18 JEE Main 2026 · 28 Jan · Shift 2 · MCQ

$\frac{6}{3^{26}} + \frac{10 \cdot 1}{3^{25}} + \frac{10 \cdot 2}{3^{24}} + \frac{10 \cdot 2^2}{3^{23}} + \ldots + \frac{10 \cdot 2^{24}}{3}$ is equal to :

(A) 3^{25}
(B) 2^{25}
(C) 3^{26}
(D) 2^{26}

Answer: (D) 2^{26} · Official NTA final key

Q19 JEE Main 2026 · 28 Jan · Shift 2 · Numerical

If $\sum_{r=1}^{25} \left(\frac{r}{r^4 + r^2 + 1} \right) = \frac{p}{q}$, where p and q are positive integers such that $\gcd(p, q) = 1$, then p + q is equal to _____.

Numerical value type: the answer is a number.

Answer: 976. · Official NTA final key

Q20 JEE Main 2026 · 24 Jan · Shift 1 · MCQ

Let 729, 81, 9, 1, ... be a sequence and P_n denote the product of the first n terms of this sequence.

If $2\sum_{n=1}^{40} (\mathrm{P}_n)^{\frac{1}{n}} = \frac{3^\alpha - 1}{3^\beta}$ and $\gcd(\alpha, \beta) = 1$, then $\alpha + \beta$ is equal to

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(A) 73
(B) 75
(C) 76
(D) 74

Answer: (A) 73 · Official NTA final key

Q21 JEE Main 2026 · 24 Jan · Shift 1 MCQ

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

(A) 136
(B) 476
(C) 238
(D) 952

Answer: (C) 238 · Official NTA final key

Q22 JEE Main 2026 · 24 Jan · Shift 2 MCQ

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 $a_1 a_2 a_3 a_4 + l^4 = 361$, then the largest term of the A.P. is equal to

(A) 27
(B) 23
(C) 24
(D) 21

Answer: (A) 27 · Official NTA final key

Q23 JEE Main 2026 · 24 Jan · Shift 2 MCQ

$\left(\frac{1}{3} + \frac{4}{7}\right) + \left(\frac{1}{3^2} + \frac{1}{3} \times \frac{4}{7} + \frac{4^2}{7^2}\right) + \left(\frac{1}{3^3} + \frac{1}{3^2} \times \frac{4}{7} + \frac{1}{3} \times \frac{4^2}{7^2} + \frac{4^3}{7^3}\right) + \ldots$ upto infinite terms, is equal to

(A) $\frac{7}{4}$
(B) $\frac{4}{3}$
(C) $\frac{6}{5}$
(D) $\frac{5}{2}$

Answer: (D) $\frac{5}{2}$ · Official NTA final key

Q24 JEE Main 2026 · 23 Jan · Shift 2 MCQ

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

(A) 3
(B) 5
(C) 7
(D) 12

Answer: (B) 5 · Official NTA final key

Q25 JEE Main 2026 · 22 Jan · Shift 1 MCQ

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

(A) -22
(B) -20
(C) -26
(D) -24

Answer: (A) -22 · Official NTA final key

Q26 JEE Main 2026 · 22 Jan · Shift 2 Numerical

Suppose a, b, c are in A.P. and a^2, $2b^2$, c^2 are in G.P. If $a < b < c$ and $a + b + c = 1$, then $9(a^2 + b^2 + c^2)$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 9. · Official NTA final key

Q27 JEE Main 2026 · 21 Jan · Shift 1 MCQ

Let $a_1, a_2, a_3, \ldots$ be a G.P. of increasing positive terms such that $a_2 \cdot a_3 \cdot a_4 = 64$ and $a_1 + a_3 + a_5 = \frac{813}{7}$. Then $a_3 + a_5 + a_7$ is equal to :

(A) 3256
(B) 3248
(C) 3244
(D) 3252

Answer: (D) 3252 · Official NTA final key

Q28 JEE Main 2026 · 21 Jan · Shift 1 Numerical

Let $a_1 = 1$ and for $n \geq 1$, $a_{n+1} = \frac{1}{2}a_n + \frac{n^2 - 2n - 1}{n^2(n+1)^2}$. Then $\left|\sum_{n=1}^{\infty}\left(a_n - \frac{2}{n^2}\right)\right|$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 2. · Official NTA final key

Q29 JEE Main 2026 · 21 Jan · Shift 2 MCQ

Let $a_1, \frac{a_2}{2}, \frac{a_3}{2^2}, \ldots, \frac{a_{10}}{2^9}$ be a G.P. of common ratio $\frac{1}{\sqrt{2}}$. If $a_1 + a_2 + \ldots + a_{10} = 62$, then a_1 is equal to :

(A) $2 - \sqrt{2}$
(B) $2(2 - \sqrt{2})$
(C) $\sqrt{2} - 1$
(D) $2(\sqrt{2} - 1)$

Answer: (D) $2(\sqrt{2} - 1)$ · Official NTA final key

Q30 JEE Main 2026 · 21 Jan · Shift 2 MCQ

The positive integer n, for which the solutions of the equation

$x(x+2) + (x+2)(x+4) + \cdots + (x+2n-2)(x+2n) = \frac{8n}{3}$ are two consecutive even integers, is :

(A) 9
(B) 3
(C) 12
(D) 6

Answer: (B) 3 · Official NTA final key

Q31 JEE Main 2025 · 8 Apr · Shift 2 MCQ

If $\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \ldots \infty = \frac{\pi^4}{90}$

$\frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \ldots \infty = \alpha$, $\frac{1}{2^4} + \frac{1}{4^4} + \frac{1}{6^4} + \ldots \infty = \beta$ then $\frac{\alpha}{\beta}$ is equal to

(A) 15
(B) 23
(C) 18
(D) 14

Answer: (A) 15 · Key from source paper

Q32 JEE Main 2025 · 7 Apr · Shift 1 MCQ

Let x_1, x_2, x_3, x_4 be in a geometric progression. If 2,7,9,5 are subtracted respectively from x_1, x_2, x_3, x_4, then the resulting numbers are in an arithmetic progression. Then the value of $\frac{1}{24}(x_1 x_2 x_3 x_4)$ is:

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(A) 18
(B) 36
(C) 216
(D) 72

Answer: (C) 216 · Key from source paper

Q33 JEE Main 2025 · 7 Apr · Shift 2 MCQ

Let a_n be the nth 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:

(A) 64
(B) 70
(C) 56
(D) 65

Answer: (A) 64 · Key from source paper

Q34 JEE Main 2025 · 7 Apr · Shift 2 MCQ

If the sum of the second, fourth and sixth terms of a G.P. of positive terms is 21 and the sum of its eighth, tenth and twelfth terms is 15309 , then the sum of its first nine terms is :

(A) 755
(B) 757
(C) 760
(D) 750

Answer: (B) 757 · Key from source paper

Q35 JEE Main 2025 · 4 Apr · Shift 1 MCQ

$1 + 3 + 5^2 + 7 + 9^2 + \ldots$ upto 40 terms is equal to

(A) 40870
(B) 43890
(C) 41880
(D) 33980

Answer: (C) 41880 · Key from source paper

Q36 JEE Main 2025 · 4 Apr · Shift 1 MCQ

Let $A = \{1, 6, 11, 16, \ldots\}$ and $B = \{9, 16, 23, 30, \ldots\}$ be the sets consisting of the first 2025 terms of two arithmetic progressions. Then $n(A \cup B)$ is

(A) 4027
(B) 3814
(C) 3761
(D) 4003

Answer: (C) 3761 · Key from source paper

Q37 JEE Main 2025 · 4 Apr · Shift 2 MCQ

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 AP'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

(A) 630
(B) 540
(C) 450
(D) 600

Answer: (B) 540 · Key from source paper

Q38 JEE Main 2025 · 4 Apr · Shift 2 MCQ

If the sum of the first 20 terms of the series

$\frac{4\cdot1}{4+3\cdot1^2+1^4} + \frac{4\cdot2}{4+3\cdot2^2+2^4} + \frac{4\cdot3}{4+3\cdot3^2+3^4} + \frac{4\cdot4}{4+3\cdot4^2+4^4} + \ldots$ is $\frac{m}{n}$,

where m and n are coprime, then $m + n$ is equal to :

(A) 423
(B) 420
(C) 422
(D) 421

Answer: (D) 421 · Key from source paper

Q39 JEE Main 2025 · 3 Apr · Shift 1 MCQ

Let $a_1, a_2, a_3, \ldots$ be a G.P. of increasing positive numbers. If $a_3a_5 = 729$ and $a_2 + a_4 = \frac{111}{4}$, then $24(a_1 + a_2 + a_3)$ is equal to

(A) 131
(B) 129
(C) 128
(D) 130

Answer: (B) 129 · Key from source paper

Q40 JEE Main 2025 · 3 Apr · Shift 1 MCQ

The sum $1+3+11+25+45+71+\ldots\ldots\ldots$ upto 20 terms, is equal to

(A) 6982
(B) 8124
(C) 7130
(D) 7240

Answer: (D) 7240 · Key from source paper

Q41 JEE Main 2025 · 3 Apr · Shift 2 MCQ

The sum $1+\frac{1+3}{2!}+\frac{1+3+5}{3!}+\frac{1+3+5+7}{4!}+\ldots$ upto ∞ terms, is equal to

(A) 3e
(B) 6e
(C) 2e
(D) 4e

Answer: (C) 2e · Key from source paper

Q42 JEE Main 2025 · 2 Apr · Shift 1 MCQ

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 :

(A) 18
(B) 10
(C) 17
(D) 11

Answer: (D) 11 · Key from source paper

Q43 JEE Main 2025 · 2 Apr · Shift 2 MCQ

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 :

(A) 10
(B) 8
(C) 6
(D) 4

Answer: (D) 4 · Key from source paper

Q44 JEE Main 2025 · 2 Apr · Shift 2 Numerical

If the sum of the first 10 terms of the series $\frac{4\cdot1}{1+4\cdot1^4}+\frac{4\cdot2}{1+4\cdot2^4}+\frac{4\cdot3}{1+4\cdot3^4}+\ldots$. is $\frac{m}{n}$, where $\gcd(m,n)=1$, then $m+n$ is equal to _____

Numerical value type: the answer is a number.

Answer: 441. · Key from source paper

Q45 JEE Main 2025 · 29 Jan · Shift 1 MCQ

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 11th term is :

(A) 90
(B) 84
(C) 122
(D) 108

Answer: (A) 90 · Key from source paper

Q46 JEE Main 2025 · 29 Jan · Shift 1 MCQ

The value of $\lim_{n\to\infty}\left(\sum_{k=1}^{n}\frac{k^3+6k^2+11k+5}{(k+3)!}\right)$ is:

(A) 4/3
(B) 2
(C) 7/3
(D) 5/3

Answer: (D) 5/3 · Key from source paper

Q47 JEE Main 2025 · 29 Jan · Shift 2 Numerical

Let $a_1, a_2, \ldots, a_{2024}$ be an Arithmetic Progression such that $a_1+(a_5+a_{10}+a_{15}+\ldots+a_{2020})+a_{2024}=2233$. Then $a_1+a_2+a_3+\ldots+a_{2024}$ is equal to _____

Numerical value type: the answer is a number.

Answer: 11132. · Key from source paper

Q48 JEE Main 2025 · 28 Jan · Shift 1 MCQ

Let $\mathrm{T_r}$ be the $\mathrm{r^{th}}$ term of an A.P. If for some m, $\mathrm{T_m}=\frac{1}{25}$, $\mathrm{T_{25}}=\frac{1}{20}$, and $20\sum_{r=1}^{25}\mathrm{T_r}=13$, then $5\,\mathrm{m}\sum_{r=m}^{2m}\mathrm{T_r}$ is equal to

(A) 98
(B) 126
(C) 142
(D) 112

Answer: (B) 126 · Key from source paper

Q49 JEE Main 2025 · 28 Jan · Shift 1 MCQ

Let $\langle a_n \rangle$ be a sequence such that $a_0 = 0, a_1 = \frac{1}{2}$ and $2a_{n+2} = 5a_{n+1} - 3a_n$, n = 0, 1, 2, 3, ... Then $\sum_{k=1}^{100} a_k$ is equal to

(A) $3a_{99} - 100$
(B) $3a_{100} - 100$
(C) $3a_{99} + 100$
(D) $3a_{100} + 100$

Answer: (B) $3a_{100} - 100$ · Key from source paper

Q50 JEE Main 2025 · 28 Jan · Shift 2 MCQ

For positive integers n, if $4a_n = (n^2 + 5n + 6)$ and $S_n = \sum_{k=1}^{n} \left(\frac{1}{a_k}\right)$, then the value of $507S_{2025}$ is :

(A) 540
(B) 675
(C) 1350
(D) 135

Answer: (B) 675 · Key from source paper

Q51 JEE Main 2025 · 28 Jan · Shift 2 Numerical

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 _____ .

Numerical value type: the answer is a number.

Answer: 20. · Key from source paper

Q52 JEE Main 2025 · 24 Jan · Shift 1 MCQ

Let $S_n = \frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \ldots$ upto n terms. If the sum of the first six terms of an A.P. with first term -p and common difference p is $\sqrt{2026\, S_{2025}}$, then the absolute difference betwen 20th and 15th terms of the A.P. is

(A) 20
(B) 90
(C) 45
(D) 25

Answer: (D) 25 · Key from source paper

Q53 JEE Main 2025 · 24 Jan · Shift 2 MCQ

If $7 = 5 + \frac{1}{7}(5+\alpha) + \frac{1}{7^2}(5+2\alpha) + \frac{1}{7^3}(5+3\alpha) + \ldots\infty$, then the value of α is :

(A) $\frac{6}{7}$
(B) 6
(C) $\frac{1}{7}$
(D) 1

Answer: (B) 6 · Key from source paper

Q54 JEE Main 2025 · 24 Jan · Shift 2 MCQ

In an arithmetic progression, if $S_{40} = 1030$ and $S_{12} = 57$, then $S_{30} - S_{10}$ is equal to :

(A) 525
(B) 510
(C) 515
(D) 505

Answer: (C) 515 · Key from source paper

Q55 JEE Main 2025 · 23 Jan · Shift 1 MCQ

If the first term of an A.P. is 3 and the sum of its first four terms is equal to one-fifth of the sum of the next four terms, then the sum of the first 20 terms is equal to

(A) -1080
(B) -1020
(C) -1200
(D) -120

Answer: (A) -1080 · Key from source paper

Q56 JEE Main 2025 · 23 Jan · Shift 2 Numerical

The roots of the quadratic equation $3x^2 - px + q = 0$ are 10th and 11th terms of an arithmetic progression with common difference $\frac{3}{2}$. If the sum of the first 11 terms of this arithmetic progression is 88 , then $q - 2p$ is equal to -.

Numerical value type: the answer is a number.

Answer: 474. · Key from source paper

Q57 JEE Main 2025 · 22 Jan · Shift 1 MCQ

Let $a_1, a_2, a_3, \ldots$ be a G.P. of increasing positive terms. If $a_1 a_5 = 28$ and $a_2 + a_4 = 29$, then a_6 is equal to:

(A) 628
(B) 812
(C) 526
(D) 784

Answer: (D) 784 · Key from source paper

Q58 JEE Main 2025 · 22 Jan · Shift 1 MCQ

If $\sum_{r=1}^{n} T_r = \frac{(2n-1)(2n+1)(2n+3)(2n+5)}{64}$, then $\lim_{n\to\infty} \sum_{r=1}^{n} \left(\frac{1}{T_r}\right)$ is equal to :

(A) 0
(B) $\frac{2}{3}$
(C) 1
(D) $\frac{1}{3}$

Answer: (B) $\frac{2}{3}$ · Key from source paper

Q59 JEE Main 2025 · 22 Jan · Shift 2 MCQ

Suppose that the number of terms in an A.P. is $2k, k \in N$. If the sum of all odd terms of the A.P. is 40 , the sum of all even terms is 55 and the last term of the A.P. exceeds the first term by 27, then k is equal to :

(A) 6
(B) 5
(C) 8
(D) 4

Answer: (B) 5 · Key from source paper

Q60 JEE Main 2024 · 9 Apr · Shift 1 MCQ

If the sum of the series $\frac{1}{1\cdot(1+d)} + \frac{1}{(1+d)(1+2\,d)} + \ldots + \frac{1}{(1+9\,d)(1+10\,d)}$ is equal to 5 , then 50 d is equal to :

EdLoop JEE

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

Answer: (B) 5 · Key from source paper

Q61 JEE Main 2024 · 9 Apr · Shift 2 · MCQ

Let a, ar, ar^2, be an infinite G.P. If $\sum_{n=0}^{\infty} ar^n = 57$ and $\sum_{n=0}^{\infty} a^3r^{3n} = 9747$, then $a + 18r$ is equal to

(A) 46
(B) 38
(C) 31
(D) 27

Answer: (C) 31 · Key from source paper

Q62 JEE Main 2024 · 9 Apr · Shift 2 · Numerical

If $\left(\frac{1}{\alpha+1} + \frac{1}{\alpha+2} + \ldots\ldots + \frac{1}{\alpha+1012}\right) - \left(\frac{1}{2\cdot1} + \frac{1}{4\cdot3} + \frac{1}{6\cdot5} + \ldots\ldots + \frac{1}{2024\cdot2023}\right) = \frac{1}{2024}$, then α is equal to _____

Numerical value type: the answer is a number.

Answer: 1011. · Key from source paper

Q63 JEE Main 2024 · 8 Apr · Shift 1 · Numerical

Let the positive integers be written in the form :

```
1
2 3
4 5 6
7 8 9 10
. .
. .
```

If the kth row contains exactly k numbers for every natural number k, then the row in which the number 5310 will be, is _____

Numerical value type: the answer is a number.

Answer: 103. · Key from source paper

Q64 JEE Main 2024 · 8 Apr · Shift 2 · MCQ

In an increasing geometric progression of positive terms, the sum of the second and sixth terms is $\frac{70}{3}$ and the product of the third and fifth terms is 49 . Then the sum of the 4th , 6th and 8th terms is equal

to :

(A) 96
(B) 91
(C) 84
(D) 78

Answer: (B) 91 · Key from source paper

Q65 JEE Main 2024 · 8 Apr · Shift 2 Numerical

An arithmetic progression is written in the following way

```
2
5 8
11 14 17
20 23 26 29
```

The sum of all the terms of the 10th row is _____

Numerical value type: the answer is a number.

Answer: 1505. · Key from source paper

Q66 JEE Main 2024 · 6 Apr · Shift 1 Numerical

Let the first term of a series be $T_1 = 6$ and its rth term $T_r = 3T_{r-1} + 6^r$, $r = 2, 3, n$. If the sum of the first n terms of this series is $\frac{1}{5}(n^2 - 12n + 39)(4 \cdot 6^n - 5 \cdot 3^n + 1)$, then n is equal to _____

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q67 JEE Main 2024 · 6 Apr · Shift 2 MCQ

Let ABC be an equilateral triangle. A new triangle is formed by joining the middle points of all sides of the triangle ABC and the same process is repeated infinitely many times. If P is the sum of perimeters and Q is be the sum of areas of all the triangles formed in this process, then :

(A) $P^2 = 6\sqrt{3}Q$
(B) $P^2 = 36\sqrt{3}Q$
(C) $P = 36\sqrt{3}Q^2$
(D) $P^2 = 72\sqrt{3}Q$

Answer: (B) $P^2 = 36\sqrt{3}Q$ · Key from source paper

Q68 JEE Main 2024 · 6 Apr · Shift 2 MCQ

A software company sets up m number of computer systems to finish an assignment in 17 days. If 4 computer systems crashed on the start of the second day, 4 more computer systems crashed on the start of the third day and so on, then it took 8 more days to finish the assignment. The value of m is equal to:

(A) 150
(B) 180
(C) 160
(D) 125

Answer: (A) 150 · Key from source paper

Q69 JEE Main 2024 · 6 Apr · Shift 2 Numerical

If $S(x) = (1+x) + 2(1+x)^2 + 3(1+x)^3 + \cdots + 60(1+x)^{60}$, $x \neq 0$, and $(60)^2\, S(60) = a(b)^b + b$, where $a, b \in N$, then $(a+b)$ equal to _____

Numerical value type: the answer is a number.

Answer: 3660. · Key from source paper

Q70 JEE Main 2024 · 5 Apr · Shift 1 MCQ

If $\frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \ldots + \frac{1}{\sqrt{99}+\sqrt{100}} = m$ and $\frac{1}{1\cdot 2} + \frac{1}{2\cdot 3} + \ldots + \frac{1}{99\cdot 100} = n$, then the point (m, n) lies on the line

(A) $11(x-1) - 100(y-2) = 0$
(B) $11x - 100y = 0$
(C) $11(x-2) - 100(y-1) = 0$
(D) $11(x-1) - 100y = 0$

Answer: (B) $11x - 100y = 0$ · Key from source paper

Q71 JEE Main 2024 · 5 Apr · Shift 1 Numerical

Let $a_1, a_2, a_3, \ldots$ be in an arithmetic progression of positive terms. Let $A_k = a_1^2 - a_2^2 + a_3^2 - a_4^2 + \ldots + a_{2k-1}^2 - a_{2k}^2$. If $A_3 = -153$, $A_5 = -435$ and $a_1^2 + a_2^2 + a_3^2 = 66$, then $a_{17} - A_7$ is equal to _____

Numerical value type: the answer is a number.

Answer: 910. · Key from source paper

Q72 JEE Main 2024 · 5 Apr · Shift 2 MCQ

For $x \geqslant 0$, the least value of K, for which $4^{1+x} + 4^{1-x}$, $\frac{K}{2}$, $16^x + 16^{-x}$ are three consecutive terms of an A.P., is equal to :

(A) 8
(B) 4
(C) 10
(D) 16

Answer: (C) 10 · Key from source paper

Q73 JEE Main 2024 · 5 Apr · Shift 2 · Numerical

If $1+\frac{\sqrt{3}-\sqrt{2}}{2\sqrt{3}}+\frac{5-2\sqrt{6}}{18}+\frac{9\sqrt{3}-11\sqrt{2}}{36\sqrt{3}}+\frac{49-20\sqrt{6}}{180}+\ldots$ upto $\infty=2+\left(\sqrt{\frac{b}{a}}+1\right)\log_e\left(\frac{a}{b}\right)$, where a and b are integers with $\gcd(a,b)=1$, then $11a+18\,b$ is equal to _____

Numerical value type: the answer is a number.

Answer: 76. · Key from source paper

Q74 JEE Main 2024 · 4 Apr · Shift 1 · MCQ

Let the first three terms $2, p$ and q, with $q \neq 2$, of a G.P. be respectively the 7th, 8th and 13th terms of an A.P. If the 5th term of the G.P. is the nth term of the A.P., then n is equal to:

(A) 163
(B) 151
(C) 177
(D) 169

Answer: (A) 163 · Key from source paper

Q75 JEE Main 2024 · 4 Apr · Shift 1 · Numerical

Let $a=1+\frac{{}^2C_2}{3!}+\frac{{}^3C_2}{4!}+\frac{{}^4C_2}{5!}+\ldots$, $b=1+\frac{{}^1C_0+{}^1C_1}{1!}+\frac{{}^2C_0+{}^2C_1+{}^2C_2}{2!}+\frac{{}^3C_0+{}^3C_1+{}^3C_2+{}^3C_3}{3!}+\ldots$ Then $\frac{2b}{a^2}$ is equal to _____

Numerical value type: the answer is a number.

Answer: 8. · Key from source paper

Q76 JEE Main 2024 · 4 Apr · Shift 2 · MCQ

The value of $\frac{1\times2^2+2\times3^2+\ldots+100\times(101)^2}{1^2\times2+2^2\times3+\ldots+100^2\times101}$ is

(A) $\frac{32}{31}$
(B) $\frac{31}{30}$
(C) $\frac{306}{305}$
(D) $\frac{305}{301}$

Answer: (D) $\frac{305}{301}$ · Key from source paper

Q77 JEE Main 2024 · 4 Apr · Shift 2 MCQ

Let three real numbers a, b, c be in arithmetic progression and $a+1, b, c+3$ be in geometric progression. If $a > 10$ and the arithmetic mean of a, b and c is 8, then the cube of the geometric mean of a, b and c is

(A) 128
(B) 316
(C) 120
(D) 312

Answer: (C) 120 · Key from source paper

Q78 JEE Main 2024 · 1 Feb · Shift 1 MCQ

Let $3, a, b, c$ be in $A.P.$ and $3, a-1, b+1, c+9$ be in $G.P.$. Then, the arithmetic mean of a, b and c is:

(A) -4
(B) -1
(C) 13
(D) 11

Answer: (D) 11 · Key from source paper

Q79 JEE Main 2024 · 1 Feb · Shift 1 Numerical

Let 3, 7, 11, 15, . . ., 403 and 2, 5, 8, 11, . . . , 404 be two arithmetic progressions. Then the sum, of the common terms in them, is equal to _____

Numerical value type: the answer is a number.

Answer: 6699. · Key from source paper

Q80 JEE Main 2024 · 1 Feb · Shift 2 MCQ

Let S_n denote the sum of the first n terms of an arithmetic progression. If $S_{10} = 390$ and the ratio of the tenth and the fifth terms is 15 : 7, then $S_{15} - S_5$ is equal to:

(A) 800
(B) 890
(C) 790
(D) 690

Answer: (C) 790 · Key from source paper

Q81 JEE Main 2024 · 1 Feb · Shift 2 Numerical

If three successive terms of a G.P. with common ratio $rr > 1$ are the length of the sides of a triangle and r denotes the greatest integer less than or equal to r, then $3r + -r$ is equal to:

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q82 JEE Main 2024 · 31 Jan · Shift 1 MCQ

The sum of the series $\frac{1}{1-3\cdot1^2+1^4}+\frac{2}{1-3\cdot2^2+2^4}+\frac{3}{1-3\cdot3^2+3^4}+\ldots$ up to 10 terms is

(A) $\frac{45}{109}$
(B) $-\frac{45}{109}$
(C) $\frac{55}{109}$
(D) $-\frac{55}{109}$

Answer: (D) $-\frac{55}{109}$ · Key from source paper

Q83 JEE Main 2024 · 31 Jan · Shift 2 MCQ

Let 2nd, 8th and 44th, terms of a non-constant $A.P.$ be respectively the 1st, 2nd and 3rd terms of $G.P.$ If the first term of A.P. is 1 then the sum of first 20 terms is equal to-

(A) 980
(B) 960
(C) 990
(D) 970

Answer: (D) 970 · Key from source paper

Q84 JEE Main 2024 · 30 Jan · Shift 1 MCQ

Let S_a denote the sum of first n terms an arithmetic progression. If $S_{20}=790$ and $S_{10}=145$, then $S_{15}-\mathrm{S}_5$ is :

(A) 395
(B) 390
(C) 405
(D) 410

Answer: (A) 395 · Key from source paper

Q85 JEE Main 2024 · 30 Jan · Shift 1 Numerical

Let $\alpha=1^2+4^2+8^2+13^2+19^2+26^2+\ldots\ldots$ upto 10 terms and $\beta=\sum_{n=1}^{10}n^4$. If $4\alpha-\beta=55k+40$, then k is equal to _____.

Numerical value type: the answer is a number.

Answer: 353. · Key from source paper

Q86 JEE Main 2024 · 30 Jan · Shift 2 MCQ

Let a and b be two distinct positive real numbers. Let 11th term of a GP, whose first term is a and third term is b, is equal to p^{th} term of another GP, whose first term is a and fifth term is b. Then p is equal to

(A) 20
(B) 25
(C) 21
(D) 24

Answer: (C) 21 · Key from source paper

Q87 JEE Main 2024 · 30 Jan · Shift 2 Numerical

Let S_n be the sum to n-terms of an arithmetic progression 3, 7, 11, ... , if $40 < \frac{6}{n(n+1)} \sum_{k=1}^{n} S_k < 42$, then n equals _____.

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q88 JEE Main 2024 · 29 Jan · Shift 1 MCQ

If in a G.P. of 64 terms, the sum of all the terms is 7 times the sum of the odd terms of the G.P, then the common ratio of the G.P. is equal to

(A) 7
(B) 4
(C) 5
(D) 6

Answer: (D) 6 · Key from source paper

Q89 JEE Main 2024 · 29 Jan · Shift 2 MCQ

If $\log_e a, \log_e b, \log_e c$ are in an $A.P.$ and $\log_e a - \log_e 2b, \log_e 2b - \log_e 3c, \log_e 3c - \log_e a$ are also in an $A.P.$, then $a : b : c$ is equal to

(A) 9 : 6 : 4
(B) 16 : 4 : 1
(C) 25 : 10 : 4
(D) 6 : 3 : 2

Answer: (A) 9 : 6 : 4 · Key from source paper

Q90 JEE Main 2024 · 29 Jan · Shift 2 MCQ

If each term of a geometric progression $a_1, a_2, a_3, \ldots$ with $a_1 = \frac{1}{8}$ and $a_2 \neq a_1$, is the arithmetic mean of the next two terms and $S_n = a_1 + a_2 + \ldots + a_n$, then $S_{20} - S_{18}$ is equal to

(A) 2^{15}
(B) -2^{18}
(C) 2^{18}
(D) -2^{15}

Answer: (D) -2^{15} · Key from source paper

Q91 JEE Main 2024 · 27 Jan · Shift 1 MCQ

The number of common terms in the progressions $4, 9, 14, 19, \ldots\ldots$, up to 25th term and $3, 6, 9, 12, \ldots$. up to 37th term is :

(A) 9
(B) 5
(C) 7
(D) 8

Answer: (C) 7 · Key from source paper

Q92 JEE Main 2024 · 27 Jan · Shift 1 Numerical

If $8 = 3 + \frac{1}{4}(3 + p) + \frac{1}{4^2}(3 + 2p) + \frac{1}{4^3}(3 + 3p) + \ldots\infty$, then the value of p is

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q93 JEE Main 2024 · 27 Jan · Shift 2 MCQ

The 20th term from the end of the progression $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \ldots, -129\frac{1}{4}$ is :-

(A) -118
(B) -110
(C) -115
(D) -100

Answer: (C) -115 · Key from source paper

Q94 JEE Main 2023 · 15 Apr · Shift 1 MCQ

Let A_1 and A_2 be two arithmetic means and G_1, G_2 and G_3 be three geometric means of two distinct positive numbers. Then $G_1^4 + G_2^4 + G_3^4 + G_1^2G_3^2$ is equal to

(A) $(A_1 + A_2)^2G_1G_3$
(B) $2(A_1 + A_2)G_1G_3$
(C) $(A_1 + A_2)G_1^2G_3^2$
(D) $2(A_1 + A_2)G_1^2G_3^2$

Answer: (A) $(A_1 + A_2)^2G_1G_3$ · Key from source paper

Q95 JEE Main 2023 · 15 Apr · Shift 1 Numerical

If the sum of the series $\left(\frac{1}{2}-\frac{1}{3}\right)+\left(\frac{1}{2^2}-\frac{1}{2\cdot 3}+\frac{1}{3^2}\right)+\left(\frac{1}{2^3}-\frac{1}{2^2\cdot 3}+\frac{1}{2\cdot 3^2}-\frac{1}{3^3}\right)+\left(\frac{1}{2^4}-\frac{1}{2^3\cdot 3}+\frac{1}{2^2\cdot 3^2}-\frac{1}{2\cdot 3^3}+\frac{1}{3^4}\right)+\ldots\ldots$ is $\frac{\alpha}{\beta}$, where α and β are co-prime, then $\alpha+3\beta$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 7. · Key from source paper

Q96 JEE Main 2023 · 13 Apr · Shift 1 MCQ

Let $s_1, s_2, s_3, \ldots, s_{10}$ respectively be the sum of 12 terms of 10 A.Ps whose first terms are 1, 2, 3, ..., 10 and the common differences are 1, 3, 5, ..., 19 respectively. Then $\sum_{i=1}^{10} s_i$ is equal to

(A) 7220
(B) 7360
(C) 7260
(D) 7380

Answer: (C) 7260 · Key from source paper

Q97 JEE Main 2023 · 13 Apr · Shift 1 Numerical

The sum to 20 terms of the series $2\cdot 2^2-3^2+2\cdot 4^2-5^2+2\cdot 6^2-\ldots\ldots\ldots\ldots$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 1310. · Key from source paper

Q98 JEE Main 2023 · 13 Apr · Shift 2 MCQ

Let $a_1, a_2, a_3, \ldots$ be a G.P. of increasing positive numbers. Let the sum of its 6th and 8th terms be 2 and the product of its 3rd and 5th terms be $\frac{1}{9}$. Then $6a_2+a_4a_4+a_6$ is equal to

(A) 3
(B) $3\sqrt{3}$
(C) 2
(D) $2\sqrt{2}$

Answer: (A) 3 · Key from source paper

Q99 JEE Main 2023 · 13 Apr · Shift 2 Numerical

Let $fx=\sum_{k=1}^{10} k\cdot x^k$, $x\in\mathbb{R}$, if $2f2+f'2=1192^n+1$ then n is equal to _____.

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q100 JEE Main 2023 · 12 Apr · Shift 1 MCQ

Let $< a_n >$ be a sequence such that $a_1 + a_2 + \ldots + a_n = \frac{n^2+3n}{(n+1)(n+2)}$. If $28 \sum_{k=1}^{10} \frac{1}{a_k} = p_1 p_2 p_3 \ldots p_m$, where $p_1, p_2, \ldots, p_m$ are the first m prime numbers, then m is equal to

(A) 5
(B) 8
(C) 6
(D) 7

Answer: (C) 6 · Key from source paper

Q101 JEE Main 2023 · 11 Apr · Shift 1 MCQ

Let $x_1, x_2, \ldots, x_{100}$ be in an arithmetic progression, with $x_1 = 2$ and their mean equal to 200. If $y_i = ix_i - i$, $1 \leq i \leq 100$, then the mean of $y_1, y_2, \ldots, y_{100}$ is

(A) 10100
(B) 10101.50
(C) 10049.50
(D) 10051.50

Answer: (C) 10049.50 · Key from source paper

Q102 JEE Main 2023 · 11 Apr · Shift 1 Numerical

Let $S = 109 + \frac{108}{5} + \frac{107}{5^2} + \ldots + \frac{2}{5^{107}} + \frac{1}{5^{108}}$. Then the value of $16S - (25)^{-54}$ is equal to

Numerical value type: the answer is a number.

Answer: 2175. · Key from source paper

Q103 JEE Main 2023 · 11 Apr · Shift 2 MCQ

Let a, b, c and d be positive real numbers such that $a + b + c + d = 11$. If the maximum value of $a^5 b^3 c^2 d$ is 3750β, then the value of β is

(A) 90
(B) 110
(C) 55
(D) 108

Answer: (A) 90 · Key from source paper

Q104 JEE Main 2023 · 11 Apr · Shift 2 Numerical

For $k \in \mathbb{N}$, if the sum of the series $1 + \frac{4}{k} + \frac{8}{k^2} + \frac{13}{k^3} + \frac{19}{k^4} + \ldots\ldots$ is 10, then the value of k is _____

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q105 JEE Main 2023 · 10 Apr · Shift 1 MCQ

Let the first term a and the common ratio r of a geometric progression be positive integers. If the sum of squares of its first three terms is 33033, then the sum of these three terms is equal to

(A) 241
(B) 231
(C) 210
(D) 220

Answer: (B) 231 · Key from source paper

Q106 JEE Main 2023 · 10 Apr · Shift 1 Numerical

The sum of all those terms, of the arithmetic progression $3, 8, 13, \ldots, 373$, which are not divisible by 3, is equal to _____.

Numerical value type: the answer is a number.

Answer: 9525. · Key from source paper

Q107 JEE Main 2023 · 10 Apr · Shift 2 MCQ

If $S_n = 4 + 11 + 21 + 34 + 50 + \ldots$ to n terms, then $\frac{1}{60}S_{29} - S_9$ is equal to

(A) 223
(B) 226
(C) 220
(D) 227

Answer: (A) 223 · Key from source paper

Q108 JEE Main 2023 · 10 Apr · Shift 2 Numerical

Suppose $a_1, a_2, 2, a_3, a_4$ be in an arithmetico-geometric progression. If the common ratio of the corresponding geometric progression is 2 and the sum of all 5 terms of the arithmetico-geometric progression is $\frac{49}{2}$, then a_4 is equal to _____

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q109 JEE Main 2023 · 8 Apr · Shift 1 MCQ

Let $S_K = \frac{1+2+\cdots+K}{K}$ and $\sum_{j=1}^{n} S_j^2 = \frac{n}{A}(Bn^2 + Cn + D)$ where $A, B, C, D \in N$ and A Has least value then

(A) $A + C + D$ is not divisible by D

(B) $A + B = 5(D - C)$

(C) $A + B + C + D$ is divisible by 5

(D) $A + B$ is divisible by D

Answer: (D) $A + B$ **is divisible by** D · Key from source paper

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Q110 JEE Main 2023 · 8 Apr · Shift 2 MCQ

Let a_n be n^{th} term of the series $5 + 8 + 14 + 23 + 35 + 50 + \ldots\ldots$ and $S_n = \sum_{k=1}^{n} a_k$. Then $S_{30} - a_{40}$ is equal to

(A) 11310

(B) 11260

(C) 11290

(D) 11280

Answer: (C) 11290 · Key from source paper

Q111 JEE Main 2023 · 8 Apr · Shift 2 Numerical

Let $0 < z < y < x$ be three real numbers such that $\frac{1}{x}, \frac{1}{y}, \frac{1}{z}$ are in an arithmetic progression and $x, \sqrt{2}y, z$ are in a geometric progression. If $xy + yz + zx = \frac{3}{\sqrt{2}}xyz$, then $3(x + y + z)^2$ is equal to

Numerical value type: the answer is a number.

Answer: 150. · Key from source paper

Q112 JEE Main 2023 · 6 Apr · Shift 1 MCQ

The sum of the first 20 terms of the series $5 + 11 + 19 + 29 + 41 + \ldots$ is

(A) 3520

(B) 3450

(C) 3250

(D) 3420

Answer: (A) 3520 · Key from source paper

Q113 JEE Main 2023 · 6 Apr · Shift 1 MCQ

Let $a_1, a_2, a_3, \ldots, a_n$ be n positive consecutive terms of an arithmetic progression. If $d > 0$ is its common difference, then $\lim_{n\to\infty} \sqrt{\frac{d}{n}\left(\frac{1}{\sqrt{a_1}+\sqrt{a_2}} + \frac{1}{\sqrt{a_2}+\sqrt{a_3}} + \ldots + \frac{1}{\sqrt{a_{n-1}}+\sqrt{a_n}}\right)}$ is

(A) $\frac{1}{\sqrt{d}}$
(B) $\sqrt{d}$
(C) 1
(D) 2

Answer: (C) 1 · Key from source paper

Q114 JEE Main 2023 · 6 Apr · Shift 2 MCQ

If $\gcd(m, n) = 1$ and $1^2 - 2^2 + 3^2 - 4^2 + \ldots + (2021)^2 - (2022)^2 + (2023)^2 = 1012m^2n$ then $m^2 - n^2$ is equal to

(A) 240
(B) 200
(C) 220
(D) 180

Answer: (A) 240 · Key from source paper

Q115 JEE Main 2023 · 6 Apr · Shift 2 Numerical

If $(20)^{19} + 2(21)(20)^{18} + 3(21)^2(20)^{17} + \ldots + 20(21)^{19} = k(20)^{19}$, then k is equal to _____ .

Numerical value type: the answer is a number.

Answer: 400. · Key from source paper

Q116 JEE Main 2023 · 1 Feb · Shift 1 MCQ

The sum to 10 terms of the series $\frac{1}{1+1^2+1^4} + \frac{2}{1+2^2+2^4} + \frac{3}{1+3^2+3^4} + \ldots$ is :-

(A) $\frac{59}{111}$
(B) $\frac{55}{111}$
(C) $\frac{56}{111}$
(D) $\frac{58}{111}$

Answer: (B) $\frac{55}{111}$ · Key from source paper

Q117 JEE Main 2023 · 1 Feb · Shift 1 Numerical

Let $a_1 = 8, a_2, a_3, \ldots . a_n$ be an A.P. If the sum of its first four terms is 50 and the sum of its last four terms is 170 , then the product of its middle two terms is _____.

Numerical value type: the answer is a number.

Answer: 754. · Key from source paper

Q118 JEE Main 2023 · 1 Feb · Shift 2 MCQ

The sum $\sum_{n=1}^{\infty} \frac{2n^2+3n+4}{(2n)!}$ is equal to :

(A) $\frac{11e}{2}+\frac{7}{2e}$

(B) $\frac{13e}{4}+\frac{5}{4e}-4$

(C) $\frac{11e}{2}+\frac{7}{2e}-4$

(D) $\frac{13e}{4}+\frac{5}{4e}$

Answer: (B) $\frac{13e}{4}+\frac{5}{4e}-4$ · Key from source paper

Q119 JEE Main 2023 · 1 Feb · Shift 2 Numerical

The sum of the common terms of the following three arithmetic progressions.
3, 7, 11, 15, ..., 399
2, 5, 8, 11, ... 359 and
2, 7, 12, 17, ..., 197, is equal to _____.

Numerical value type: the answer is a number.

Answer: 321. · Key from source paper

Q120 JEE Main 2023 · 31 Jan · Shift 1 MCQ

If the sum and product of four positive consecutive terms of a G.P., are 126 and 1296, respectively, then the sum of common ratios of all such GPs is

(A) 7

(B) $\frac{9}{2}$

(C) 3

(D) 14

Answer: (A) 7 · Key from source paper

Q121 JEE Main 2023 · 31 Jan · Shift 1 Numerical

Let $a_1, a_2, \ldots \ldots, a_n$ be in A.P. If $a_5 = 2a_7$ and $a_{11} = 18$, then $12\frac{1}{\sqrt{a_{10}}+\sqrt{a_{11}}}+\frac{1}{\sqrt{a_{11}}+\sqrt{a_{12}}}+\ldots .\frac{1}{\sqrt{a_{17}}+\sqrt{a_{18}}}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 8. · Key from source paper

Q122 JEE Main 2023 · 31 Jan · Shift 2 MCQ

Let $a_1, a_2, a_3, \ldots\ldots$ be an A.P. If $a_7 = 3$, the product $(a_1 a_4)$ is minimum and the sum of its first n terms is zero then $n! - 4a_{n(n+2)}$ is equal to

(A) $\frac{381}{4}$
(B) 9
(C) $\frac{33}{4}$
(D) 24

Answer: (D) 24 · Key from source paper

Q123 JEE Main 2023 · 31 Jan · Shift 2 Numerical

The sum $1^2 - 2.3^2 + 3.5^2 - 4.7^2 + 5.9^2 - \ldots\cdots + 15.29^2$ is _____ .

Numerical value type: the answer is a number.

Answer: 6952. · Key from source paper

Q124 JEE Main 2023 · 30 Jan · Shift 1 MCQ

If $a_n = \frac{-2}{4n^2 - 16n + 15}$, then $a_1 + a_2 + \ldots + a_{25}$ is equal to:

(A) $\frac{51}{144}$
(B) $\frac{49}{138}$
(C) $\frac{50}{141}$
(D) $\frac{52}{147}$

Answer: (C) $\frac{50}{141}$ · Key from source paper

Q125 JEE Main 2023 · 30 Jan · Shift 1 Numerical

$\sum_{n=0}^{\infty} \frac{n^3((2n)!) + (2n-1)(n!)}{(n!)((2n)!)} = ae + \frac{b}{e} + c$ where $a, b, c \in Z$ and $e = \sum_{n=0}^{\infty} \frac{1}{n!}$. Then $a^2 - b + c$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 26. · Key from source paper

Q126 JEE Main 2023 · 30 Jan · Shift 2 MCQ

Let $a, b, c > 1$, a^3, b^3 and c^3 be in A. P. and $\log_a b$, $\log_c a$ and $\log_b c$ be in G. P. If the sum of first 20 terms of an A. P., whose first term is $\frac{a+4b+c}{3}$ and the common difference is $\frac{a-8b+c}{10}$ is -444, then abc is equal to

(A) 343

(B) 216

(C) $\frac{343}{8}$

(D) $\frac{125}{8}$

Answer: (B) 216 · Key from source paper

Q127 JEE Main 2023 · 30 Jan · Shift 2 Numerical

The 8th common term of the series

$S_1 = 3 + 7 + 11 + 15 + 19 + \ldots$

$S_2 = 1 + 6 + 11 + 16 + 21 + \ldots$. is

Numerical value type: the answer is a number.

Answer: 151. · Key from source paper

Q128 JEE Main 2023 · 29 Jan · Shift 1 Numerical

Let $a_1, a_2, a_3, \ldots$ be a GP of increasing positive numbers. If the product of fourth and sixth terms is 9 and the sum of fifth and seventh terms is 24 , then $a_1 a_9 + a_2 a_4 a_9 + a_5 + a_7$ is equal to

Numerical value type: the answer is a number.

Answer: 60. · Key from source paper

Q129 JEE Main 2023 · 29 Jan · Shift 1 Numerical

Suppose f is a function satisfying $f(x+y) = f(x) + f(y)$ for all $x, y \in \mathbb{N}$ and $f(1) = \frac{1}{5}$. If $\sum_{n=1}^{m} \frac{f(n)}{n(n+1)(n+2)} = \frac{1}{12}$ then m is equal to _____ .

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q130 JEE Main 2023 · 29 Jan · Shift 2 Numerical

Let $a_1 = b_1 = 1$ and $a_n = a_{n-1} + (n-1)$, $b_n = b_{n-1} + a_{n-1}$, $\forall n \geq 2$. If $S = \sum_{n=1}^{10} \left(\frac{b_n}{2^n}\right)$ and $T = \sum_{n=1}^{8} \frac{n}{2^{n-1}}$ then $2^7(2S - T)$ is equal to

Numerical value type: the answer is a number.

Answer: 461. · Key from source paper

Q131 JEE Main 2023 · 29 Jan · Shift 2 Numerical

Let $\{a_k\}$ and $\{b_k\}$, $k \in \mathbb{N}$, be two G.P.s with common ratio r_1 and r_2 respectively such that $a_1 = b_1 = 4$ and $r_1 < r_2$. Let $c_k = a_k + b_k$, $k \in \mathbb{N}$. If $c_2 = 5$ and $c_3 = \frac{13}{4}$ then $\sum_{k=1}^{\infty} c_k - (12a_6 + 8b_4)$ is equal to

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q132 JEE Main 2023 · 29 Jan · Shift 2 MCQ

Consider a function f : $\mathbb{N} \to \mathbb{R}$, satisfying $f(1) + 2f(2) + 3f(3) + \ldots + xf(x) = x(x+1)f(x)$; $x \geq 2$ with $f(1) = 1$. Then $\frac{1}{f(2022)} + \frac{1}{f(2028)}$ is equal to

(A) 8200
(B) 8000
(C) 8400
(D) 8100

Answer: (D) 8100 · Key from source paper

Q133 JEE Main 2023 · 25 Jan · Shift 1 Numerical

Let A_1, A_2, A_3 be the three A.P. with the same common difference d and having their first terms as $A, A+1, A+2$, respectively. Let a, b, c be the 7th , 9th , 17th terms of A_1, A_2, A_3, respectively such that $\begin{vmatrix} a & 7 & 1 \\ 2b & 17 & 1 \\ c & 17 & 1 \end{vmatrix} + 70 = 0$. If $a = 29$, then the sum of first 20 terms of an AP whose first term is $c - a - b$ and common difference is $\frac{d}{12}$, is equal to _____ .

Numerical value type: the answer is a number.

Answer: 495. · Key from source paper

Q134 JEE Main 2023 · 25 Jan · Shift 2 Numerical

For the two positive numbers a, b, if a, b and $\frac{1}{18}$ are in a geometric progression, while $\frac{1}{a}$, 10 and $\frac{1}{b}$ are in an arithmetic progression, then, $16a + 12b$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q135 JEE Main 2023 · 24 Jan · Shift 1 Numerical

The 4th term of GP is 500 and its common ratio is $\frac{1}{m}$, $m \in N$. Let S_n denote the sum of the first n terms of this GP. If $S_6 > S_5 + 1$ and $S_7 < S_6 + \frac{1}{2}$, then the number of possible values of m is _____

Numerical value type: the answer is a number.

Answer: 12. · Key from source paper

Q136 JEE Main 2023 · 24 Jan · Shift 2 Numerical

If $\frac{1^3+2^3+3^3+\ldots\ldots\text{upto } n \text{ terms}}{1\cdot3+2\cdot5+3\cdot7+\ldots\text{upto } n \text{ terms}} = \frac{9}{5}$ then the value of n is

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q137 JEE Main 2022 · 29 Jul · Shift 1 MCQ

If $\frac{1}{(20-a)(40-a)}+\frac{1}{(40-a)(60-a)}+\ldots\ldots+\frac{1}{(180-a)(200-a)}=\frac{1}{256}$, then the maximum value of a is

(A) 198
(B) 202
(C) 212
(D) 218

Answer: (C) 212 · Key from source paper

Q138 JEE Main 2022 · 29 Jul · Shift 1 Numerical

Let $a_1, a_2, a_3, \ldots$ be an A.P. If $\sum_{r=1}^{\infty}\frac{a_r}{2^r}=4$, then $4a_2$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q139 JEE Main 2022 · 29 Jul · Shift 1 Numerical

If $\frac{1}{2\times3\times4}+\frac{1}{3\times4\times5}+\frac{1}{4\times5\times6}+\ldots+\frac{1}{100\times101\times102}=\frac{k}{101}$, then $34k$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 286. · Key from source paper

Q140 JEE Main 2022 · 29 Jul · Shift 2 MCQ

Let $a_n{}_{n=0}^{\infty}$ be a sequence such that $a_0=a_1=0$ and $a_{n+2}=3a_{n+1}-2a_n+1, \forall n\geq 0$. Then $a_{25}a_{23}-2a_{25}a_{22}-2a_{23}a_{24}+4a_{22}a_{24}$ is equal to

(A) 483
(B) 528
(C) 575
(D) 624

Answer: (B) 528 · Key from source paper

Q141 JEE Main 2022 · 29 Jul · Shift 2 MCQ

$\sum_{r=1}^{20} r^2+1r!$ is equal to

(A) $22!-21!$
(B) $22!-221!$
(C) $21!-220!$
(D) $21!-20!$

Answer: (B) $22!-221!$ · Key from source paper

Q142 JEE Main 2022 · 28 Jul · Shift 1 MCQ

Consider the sequence $a_1, a_2, a_3, \ldots \ldots$ such that $a_1 = 1, a_2 = 2$ and $a_{n+2} = \frac{2}{a_{n+1}} + a_n$ for $n = 1, 2, 3, \ldots$

If $\frac{a_1+\frac{1}{a_2}}{a_3} \cdot \frac{a_2+\frac{1}{a_3}}{a_4} \cdot \frac{a_3+\frac{1}{a_4}}{a_5} \ldots \frac{a_{30}+\frac{1}{a_{31}}}{a_{32}} = 2^{\alpha}\,{}^{61}C_{31}$ then α is equal to

(A) -30

(B) -31

(C) -60

(D) -61

Answer: (C) -60 · Key from source paper

Q143 JEE Main 2022 · 28 Jul · Shift 2 Numerical

If $\frac{6}{3^{12}} + \frac{10}{3^{11}} + \frac{20}{3^{10}} + \frac{40}{3^9} + \ldots\ldots + \frac{10240}{3} = 2^n \cdot m$, where m is odd, then $m.n$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 12. · Key from source paper

Q144 JEE Main 2022 · 27 Jul · Shift 1 MCQ

Suppose $a_1, a_2, \ldots, a_n, \ldots$ be an arithmetic progression of natural numbers. If the ratio of the sum of the first five terms to the sum of first nine terms of the progression is 5 : 17 and $110 < a_{15} < 120$, then the sum of the first ten terms of the progression is equal to

(A) 290

(B) 380

(C) 460

(D) 510

Answer: (B) 380 · Key from source paper

Q145 JEE Main 2022 · 27 Jul · Shift 2 MCQ

Let the sum of an infinite G. P., whose first term is a and the common ratio is r, be 5. Let the sum of its first five terms be $\frac{98}{25}$. Then the sum of the first 21 terms of an AP, whose first term is $10ar$, n^{th} term is a_n and the common difference is $10\,ar^2$, is equal to

(A) $21a_{11}$

(B) $22a_{11}$

(C) $15a_{16}$

(D) $14a_{16}$

Answer: (A) $21a_{11}$ · Key from source paper

Q146 JEE Main 2022 · 27 Jul · Shift 2 Numerical

$\frac{2^3-1^3}{1\times7}+\frac{4^3-3^3+2^3-1^3}{2\times11}+\frac{6^3-5^3+4^3-3^3+2^3-1^3}{3\times15}+\ldots\ldots+\frac{30^3-29^3+28^3-27^3+\ldots+2^3-1^3}{15\times63}$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 120. · Key from source paper

Q147 JEE Main 2022 · 26 Jul · Shift 1 MCQ

Consider two G.Ps. $2, 2^2, 2^3, \ldots$ and $4, 4^2, 4^3, \ldots$ of 60 and n terms respectively. If the geometric mean of all the $60+n$ terms is $(2)^{\frac{225}{8}}$, then $\sum_{k=1}^{n} k(n-k)$ is equal to:

(A) 560
(B) 1540
(C) 1330
(D) 2600

Answer: (C) 1330 · Key from source paper

Q148 JEE Main 2022 · 26 Jul · Shift 1 Numerical

The series of positive multiples of 3 is divided into sets : $\{3\}, \{6, 9, 12\}, \{15, 18, 21, 24, 27\}, \ldots$ Then the sum of the elements in the 11th set is equal to _____ .

Numerical value type: the answer is a number.

Answer: 6993. · Key from source paper

Q149 JEE Main 2022 · 26 Jul · Shift 2 Numerical

If $\sum_{k=1}^{10} \frac{k}{k^4+k^2+1} = \frac{m}{n}$, where m and n are co-prime, then $m+n$ is equal to

Numerical value type: the answer is a number.

Answer: 166. · Key from source paper

Q150 JEE Main 2022 · 26 Jul · Shift 2 Numerical

Different A.P.'s are constructed with the first term 100, the last term 199, And integral common differences. The sum of the common differences of all such, A.P's having at least 3 terms and at most 33 terms is.

Numerical value type: the answer is a number.

Answer: 53. · Key from source paper

Q151 JEE Main 2022 · 25 Jul · Shift 1 Numerical

Let $a_1 = b_1 = 1, a_n = a_{n-1} + 2$ and $b_n = a_n + b_{n-1}$ for every natural number $n \geq 2$. Then $\sum_{n=1}^{15} a_n \cdot b_n$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 27560. · Key from source paper

Q152 JEE Main 2022 · 25 Jul · Shift 2 MCQ

The sum $\sum_{n=1}^{21} \frac{3}{(4n-1)(4n+3)}$ is equal to

(A) $\frac{7}{87}$
(B) $\frac{7}{29}$
(C) $\frac{14}{87}$
(D) $\frac{21}{29}$

Answer: (B) $\frac{7}{29}$ · Key from source paper

Q153 JEE Main 2022 · 29 Jun · Shift 1 MCQ

Let $\{a_n\}_{n=0}^{\infty}$ be a sequence such that $a_0 = a_1 = 0$ and $a_{n+2} = 2a_{n+1} - a_n + 1$ for all $n \geq 0$. Then, $\sum_{n=2}^{\infty} \frac{a_n}{7^n}$ is equal to

(A) $\frac{6}{343}$
(B) $\frac{7}{216}$
(C) $\frac{8}{343}$
(D) $\frac{49}{216}$

Answer: (B) $\frac{7}{216}$ · Key from source paper

Q154 JEE Main 2022 · 29 Jun · Shift 2 MCQ

The sum of the infinite series $1 + \frac{5}{6} + \frac{12}{6^2} + \frac{22}{6^3} + \frac{35}{6^4} + \frac{51}{6^5} + \frac{70}{6^6} + \ldots$ is equal to:

(A) $\frac{425}{216}$
(B) $\frac{429}{216}$
(C) $\frac{288}{125}$
(D) $\frac{280}{125}$

Answer: (C) $\frac{288}{125}$ · Key from source paper

Q155 JEE Main 2022 · 29 Jun · Shift 2 Numerical

Let 3, 6, 9, 12, . . . upto 78 terms and 5, 9, 13, 17, . . . upto 59 terms be two series. Then, the sum of the terms common to both the series is equal to _____.

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Numerical value type: the answer is a number.

Answer: 2223. · Key from source paper

Q156 JEE Main 2022 · 28 Jun · Shift 1 MCQ

Let $A_1, A_2, A_3, \ldots\ldots$ be an increasing geometric progression of positive real numbers. If $A_1A_3A_5A_7 = \frac{1}{1296}$ and $A_2 + A_4 = \frac{7}{36}$, then, the value of $A_6 + A_8 + A_{10}$ is equal to

(A) 43
(B) 33
(C) 37
(D) 48

Answer: (A) 43 · Key from source paper

Q157 JEE Main 2022 · 28 Jun · Shift 1 Numerical

Let $A = \{1, a_1, a_2 \ldots\ldots a_{18}, 77\}$ be a set of integers with $1 < a_1 < a_2 < \ldots\ldots < a_{18} < 77$. Let the set $A + A = \{x + y : x, y \in A\}$ contain exactly 39 elements. Then, the value of $a_1 + a_2 + \ldots\ldots + a_{18}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 702. · Key from source paper

Q158 JEE Main 2022 · 28 Jun · Shift 2 MCQ

If n arithmetic means are inserted between a and 100 such that the ratio of the first mean to the last mean is $1 : 7$ and $a + n = 33$, then the value of n is

(A) 21
(B) 22
(C) 23
(D) 24

Answer: (C) 23 · Key from source paper

Q159 JEE Main 2022 · 28 Jun · Shift 2 Numerical

Let for $n = 1, 2, \ldots\ldots, 50$, S_n be the sum of the infinite geometric progression whose first term is n^2 and whose common ratio is $\frac{1}{(n+1)^2}$. Then the value of $\frac{1}{26} + \sum_{n=1}^{50}\left(S_n + \frac{2}{n+1} - n - 1\right)$ is equal to

Numerical value type: the answer is a number.

Answer: 41651. · Key from source paper

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Q160 JEE Main 2022 · 27 Jun · Shift 1 MCQ

If $x=\sum_{n=0}^{\infty}a^n,\ y=\sum_{n=0}^{\infty}b^n,\ z=\sum_{n=0}^{\infty}c^n$, where a,b,c are in A.P. and $|a|<1,|b|<1,|c|<1,abc\neq 0$, then

(A) x,y,z are in A.P.

(B) x,y,z are in G.P.

(C) $\frac{1}{x},\frac{1}{y},\frac{1}{z}$ are in A.P.

(D) $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=1-(a+b+c)$

Answer: (C) $\frac{1}{x},\frac{1}{y},\frac{1}{z}$ are in A.P. · Key from source paper

Q161 JEE Main 2022 · 27 Jun · Shift 1 Numerical

If the sum of the first ten terms of the series $\frac{1}{5}+\frac{2}{65}+\frac{3}{325}+\frac{4}{1025}+\frac{5}{2501}+\ldots\ldots$ is $\frac{m}{n}$, where m and n are co-prime numbers, then $m+n$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 276. · Key from source paper

Q162 JEE Main 2022 · 27 Jun · Shift 2 MCQ

Let $S=2+\frac{6}{7}+\frac{12}{7^2}+\frac{20}{7^3}+\frac{30}{7^4}+\ldots\ldots$ then $4S$ is equal to

(A) $\left(\frac{7}{2}\right)^2$

(B) $\left(\frac{7}{3}\right)^3$

(C) $\frac{7}{3}$

(D) $\left(\frac{7}{3}\right)^4$

Answer: (B) $\left(\frac{7}{3}\right)^3$ · Key from source paper

Q163 JEE Main 2022 · 27 Jun · Shift 2 MCQ

If $a_1,a_2,a_3\ldots$ and $b_1,b_2,b_3\ldots$ are A.P. and $a_1=2,a_{10}=3,a_1b_1=1=a_{10}b_{10}$ then a_4b_4 is equal to

(A) $\frac{28}{27}$

(B) $\frac{28}{24}$

(C) $\frac{23}{26}$

(D) $\frac{22}{23}$

Answer: (A) $\frac{28}{27}$ · Key from source paper

Q164 JEE Main 2022 · 26 Jun · Shift 1 Numerical

Let $A=\sum_{i=1}^{10}\sum_{j=1}^{10}\min\{i,j\}$ and $B=\sum_{i=1}^{10}\sum_{j=1}^{10}\max\{i,j\}$. Then $A+B$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 1100. · Key from source paper

Q165 JEE Main 2022 · 26 Jun · Shift 1 · Numerical

Let $A = \{n \in N : \text{H.C.F. } (n, 45) = 1\}$ and let $B = \{2k : k \in \{1, 2, \ldots, 100\}\}$. Then the sum of all elements of $A \cap B$ is _____ .

Numerical value type: the answer is a number.

Answer: 5264. · Key from source paper

Q166 JEE Main 2022 · 26 Jun · Shift 2 · MCQ

If $A = \sum_{n=1}^{\infty} \frac{1}{(3+(-1)^n)^n}$ and $B = \sum_{n=1}^{\infty} \frac{(-1)^n}{(3+(-1)^n)^n}$, then $\frac{A}{B}$ is equal to

(A) $\frac{11}{9}$
(B) 1
(C) $-\frac{11}{9}$
(D) $-\frac{11}{3}$

Answer: (C) $-\frac{11}{9}$ · Key from source paper

Q167 JEE Main 2022 · 26 Jun · Shift 2 · Numerical

If $a_1(>0), a_2, a_3, a_4, a_5$ are in a G.P. , $a_2 + a_4 = 2a_3 + 1$ and $3a_2 + a_3 = 2a_4$, then $a_2 + a_4 + 2a_5$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 40. · Key from source paper

Q168 JEE Main 2022 · 25 Jun · Shift 1 · MCQ

If $\frac{1}{2 \cdot 3^{10}} + \frac{1}{2^2 \cdot 3^9} + \ldots + \frac{1}{2^{10} \cdot 3} = \frac{K}{2^{10} \cdot 3^{10}}$, then the remainder when K is divided by 6 is

(A) 2
(B) 3
(C) 4
(D) 5

Answer: (D) 5 · Key from source paper

Q169 JEE Main 2022 · 25 Jun · Shift 1 · Numerical

For a natural number n, let $\alpha_n = 19^n - 12^n$. Then, the value of $\frac{31\alpha_9 - \alpha_{10}}{57\alpha_8}$ is _____

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q170 JEE Main 2022 · 25 Jun · Shift 1 · Numerical

The greatest integer less than or equal to the sum of first 100 terms of the sequence $\frac{1}{3}, \frac{5}{9}, \frac{19}{27}, \frac{65}{81}, \ldots$ is equal to _____

Numerical value type: the answer is a number.

Answer: 98. · Key from source paper

Q171 JEE Main 2022 · 25 Jun · Shift 2 MCQ

The sum $1 + 2 \cdot 3 + 3 \cdot 3^2 + \ldots\ldots\ldots + 10 \cdot 3^9$ is equal to

(A) $\frac{2 \cdot 3^{12}+10}{4}$
(B) $\frac{19 \cdot 3^{10}+1}{4}$
(C) $5 \cdot 3^{10} - 2$
(D) $\frac{9 \cdot 3^{10}+1}{2}$

Answer: (B) $\frac{19 \cdot 3^{10}+1}{4}$ · Key from source paper

Q172 JEE Main 2022 · 24 Jun · Shift 1 MCQ

If $\{a_i\}_{i=1}^{n}$, where n is an even integer, is an arithmetic progression with common difference 1, and $\sum_{i=1}^{n} a_i = 192$, $\sum_{i=1}^{n/2} a_{2i} = 120$, then n is equal to

(A) 18
(B) 36
(C) 96
(D) 48

Answer: (C) 96 · Key from source paper

Q173 JEE Main 2022 · 24 Jun · Shift 2 MCQ

Let $x, y > 0$. If $x^3 y^2 = 2^{15}$, then the least value of $3x + 2y$ is

(A) 30
(B) 32
(C) 36
(D) 40

Answer: (D) 40 · Key from source paper

Q174 JEE Main 2021 · 1 Sep · Shift 2 MCQ

Let $S_n = 1 \cdot (n-1) + 2 \cdot (n-2) + 3 \cdot (n-3) + \ldots + (n-1) \cdot 1$, $n \geqslant 4$. The sum $\sum_{n=4}^{\infty} \frac{2\,S_n}{n!} - \frac{1}{(n-2)!}$ is equal to :

(A) $\frac{e-2}{6}$
(B) $\frac{e-1}{3}$
(C) $\frac{e}{6}$
(D) $\frac{e}{3}$

Answer: (B) $\frac{e-1}{3}$ · Key from source paper

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Q175 JEE Main 2021 · 1 Sep · Shift 2 MCQ

Let $a_1, a_2, \ldots, a_{21}$ be an $A.P.$ such that $\sum_{n=1}^{20} \frac{1}{a_n a_{n+1}} = \frac{4}{9}$. If the sum of this $A.P.$ is 189, then $a_6 a_{16}$ is equal to :

(A) 57
(B) 48
(C) 36
(D) 72

Answer: (D) 72 · Key from source paper

Q176 JEE Main 2021 · 31 Aug · Shift 1 MCQ

The sum of 10 terms of the series $\frac{3}{1^2 \times 2^2} + \frac{5}{2^2 \times 3^2} + \frac{7}{3^2 \times 4^2} + \ldots$ is :

(A) $\frac{143}{144}$
(B) $\frac{99}{100}$
(C) 1
(D) $\frac{120}{121}$

Answer: (D) $\frac{120}{121}$ · Key from source paper

Q177 JEE Main 2021 · 31 Aug · Shift 1 MCQ

Three numbers are in an increasing geometric progression with common ratio r. If the middle number is doubled, then the new numbers are in an arithmetic progression with common difference d. If the fourth term of GP is $3r^2$, then $r^2 - d$ is equal to :

(A) $7 - \sqrt{3}$
(B) $7 + 3\sqrt{3}$
(C) $7 - 7\sqrt{3}$
(D) $7 + \sqrt{3}$

Answer: (D) $7 + \sqrt{3}$ · Key from source paper

Q178 JEE Main 2021 · 31 Aug · Shift 2 MCQ

Let $a_1, a_2, a_3, \ldots$ be an A.P. If $\frac{a_1 + a_2 + \ldots + a_{10}}{a_1 + a_2 + \ldots + a_p} = \frac{100}{p^2}$, $p \neq 10$, then $\frac{a_{11}}{a_{10}}$ is equal to :

(A) $\frac{19}{21}$
(B) $\frac{100}{121}$
(C) $\frac{21}{19}$
(D) $\frac{121}{100}$

Answer: (C) $\frac{21}{19}$ · Key from source paper

Q179 JEE Main 2021 · 31 Aug · Shift 2 Numerical

If $S = \frac{7}{5} + \frac{9}{5^2} + \frac{13}{5^3} + \frac{19}{5^4} + \ldots$, then $160\,S$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 305. · Key from source paper

Q180 JEE Main 2021 · 27 Aug · Shift 1 MCQ

If for $x, y \in R$, $x > 0$, $y = \log_{10} x + \log_{10} x^{1/3} + \log_{10} x^{1/9} + \ldots$ upto ∞ terms and $\frac{2+4+6+\ldots+2y}{3+6+9+\ldots+3y} = \frac{4}{\log_{10} x}$, then the ordered pair (x, y) is equal to

(A) $(10^6, 6)$
(B) $(10^6, 9)$
(C) $(10^2, 3)$
(D) $(10^4, 6)$

Answer: (B) $(10^6, 9)$ · Key from source paper

Q181 JEE Main 2021 · 27 Aug · Shift 1 MCQ

If $0 < x < 1$, then $\frac{3}{2}x^2 + \frac{5}{3}x^3 + \frac{7}{4}x^4 + \ldots$, is equal to

(A) $x\left(\frac{x+1}{1-x}\right) + \log_e(1-x)$
(B) $x\left(\frac{1-x}{1+x}\right) + \log_e(1-x)$
(C) $\frac{1+x}{1-x} + \log_e(1-x)$
(D) $\frac{1-x}{1+x} + \log_e(1-x)$

Answer: (A) $x\left(\frac{x+1}{1-x}\right) + \log_e(1-x)$ · Key from source paper

Q182 JEE Main 2021 · 27 Aug · Shift 2 MCQ

If $0 < x < 1$ and $y = \frac{1}{2}x^2 + \frac{2}{3}x^3 + \frac{3}{4}x^4 + \ldots\ldots$, then the value of e^{1+y} at $x = \frac{1}{2}$ is:

(A) $\frac{1}{2}e^2$
(B) $2e$
(C) $2e^2$
(D) $\frac{1}{2}\sqrt{e}$

Answer: (A) $\frac{1}{2}e^2$ · Key from source paper

Q183 JEE Main 2021 · 26 Aug · Shift 1 MCQ

If the sum of an infinite GP, $a,\ ar,\ ar^2,\ ar^3, \ldots$ is 15 and the sum of the squares of its each term is 150, then the sum of $ar^2, ar^4, ar^6, \ldots$ is:

(A) $\frac{25}{2}$
(B) $\frac{9}{2}$
(C) $\frac{1}{2}$
(D) $\frac{5}{2}$

Answer: (C) $\frac{1}{2}$ · Key from source paper

Q184 JEE Main 2021 · 26 Aug · Shift 2 MCQ

$\lim_{x\to 2}\left(\sum_{n=1}^{9}\frac{x}{n(n+1)x^2+2(2n+1)x+4}\right)$ is equal to :

(A) $\frac{5}{24}$
(B) $\frac{7}{36}$
(C) $\frac{1}{5}$
(D) $\frac{9}{44}$

Answer: (D) $\frac{9}{44}$ · Key from source paper

Q185 JEE Main 2021 · 26 Aug · Shift 2 Numerical

Let $a_1, a_2, \ldots, a_{10}$ be an $A.P.$ with common difference -3 and $b_1,\ b_2, \ldots, b_{10}$ be a $G.P.$ with common ratio 2. Let $c_k = a_k + b_k,\ k = 1, 2, \ldots, 10$. If $c_2 = 12$ and $c_3 = 13$, then $\sum_{k=1}^{10} c_k$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 2021. · Key from source paper

Q186 JEE Main 2021 · 25 Jul · Shift 1 MCQ

Let S_n be the sum of the first n terms of an arithmetic progression. If $S_{3n} = 3S_{2n}$, then the value of $\frac{S_{4n}}{S_{2n}}$ is :

(A) 6
(B) 4
(C) 2
(D) 8

Answer: (A) 6 · Key from source paper

Q187 JEE Main 2021 · 25 Jul · Shift 1 Numerical

If the value of $1 + \frac{2}{3} + \frac{6}{3^2} + \frac{10}{3^3} + \ldots \text{ upto } \infty^{\log_{0.25}\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+\ldots \text{ upto } \infty}$ is l, then l^2 is equal to _____.

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q188 JEE Main 2021 · 22 Jul · Shift 1 MCQ

Let S_n denote the sum of first n-terms of an arithmetic progression. If $S_{10} = 530$, $S_5 = 140$, then $S_{20} - S_6$ is equal to:

(A) 1862
(B) 1842
(C) 1852
(D) 1872

Answer: (A) 1862 · Key from source paper

Q189 JEE Main 2021 · 20 Jul · Shift 2 Numerical

Let $\{a_n\}_{n=1}^{\infty}$ be a sequence such that $a_1 = 1, a_2 = 1$ and $a_{n+2} = 2a_{n+1} + a_n$ for all $n \geq 1$. Then the value of $47\sum_{n=1}^{\infty}\left(\frac{a_n}{2^{3n}}\right)$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 7. · Key from source paper

Q190 JEE Main 2021 · 18 Mar · Shift 1 MCQ

If α, β are natural numbers such that $100^{\alpha} - 199\beta = (100)(100) + (99)(101) + (98)(102) + \ldots\ldots + (1)(199)$, then the slope of the line passing through (α, β) and origin is:

(A) 540
(B) 550
(C) 530
(D) 510

Answer: (B) 550 · Key from source paper

Q191 JEE Main 2021 · 18 Mar · Shift 1 MCQ

$\frac{1}{3^2-1} + \frac{1}{5^2-1} + \frac{1}{7^2-1} + \ldots + \frac{1}{(201)^2-1}$ is equal to

(A) $\frac{101}{404}$
(B) $\frac{25}{101}$
(C) $\frac{101}{408}$
(D) $\frac{99}{400}$

Answer: (B) $\frac{25}{101}$ · Key from source paper

Q192 JEE Main 2021 · 18 Mar · Shift 2 MCQ

Let S_1 be the sum of first $2n$ terms of an arithmetic progression. Let S_2 be the sum of first $4n$ terms of the same arithmetic progression. If $(S_2 - S_1)$ is 1000, then the sum of the first $6n$ terms of the arithmetic progression is equal to:

(A) 1000
(B) 7000
(C) 5000
(D) 3000

Answer: (D) 3000 · Key from source paper

Q193 JEE Main 2021 · 18 Mar · Shift 2 · Numerical

If $\sum_{r=1}^{10} r!\left(r^3+6r^2+2r+5\right)=\alpha(11!)$, then the value of α is equal to _____ .

Numerical value type: the answer is a number.

Answer: 160. · Key from source paper

Q194 JEE Main 2021 · 16 Mar · Shift 1 · Numerical

Consider an arithmetic series and a geometric series having four initial terms from the set $\{11, 8, 21, 16, 26, 32, 4\}$. If the last terms of these series are the maximum possible four digit numbers, then the number of common terms in these two series is equal to _____.

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q195 JEE Main 2021 · 16 Mar · Shift 2 · Numerical

Let $\frac{1}{16}$, a and b be in G.P. and $\frac{1}{a}$, $\frac{1}{b}$, 6 be in A.P., where $a, b > 0$. Then $72(a+b)$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 14. · Key from source paper

Q196 JEE Main 2021 · 16 Mar · Shift 2 · Numerical

Let $S_n(x) = \log_{a^{1/2}} x + \log_{a^{1/3}} x + \log_{a^{1/6}} x + \log_{a^{1/11}} x + \log_{a^{1/18}} x + \log_{a^{1/27}} x + \ldots$ up to n-terms, where $a > 1$. If $S_{24}(x) = 1093$ and $S_{12}(2x) = 265$, then value of a is equal to _____.

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q197 JEE Main 2021 · 26 Feb · Shift 1 · MCQ

The sum of the infinite series $1+\frac{2}{3}+\frac{7}{3^2}+\frac{12}{3^3}+\frac{17}{3^4}+\frac{22}{3^5}+\ldots\ldots$ is equal to:

(A) $\frac{9}{4}$
(B) $\frac{15}{4}$
(C) $\frac{11}{4}$
(D) $\frac{13}{4}$

Answer: (D) $\frac{13}{4}$ · Key from source paper

Q198 JEE Main 2021 · 26 Feb · Shift 1 MCQ

In an increasing geometric series, the sum of the second and the sixth term is $\frac{25}{2}$ and the product of the third and fifth term is 25. Then, the sum of 4th, 6th and 8th terms is equal to:

(A) 35
(B) 32
(C) 26
(D) 30

Answer: (A) 35 · Key from source paper

Q199 JEE Main 2021 · 26 Feb · Shift 2 MCQ

The sum of the series $\sum_{n=1}^{\infty} \frac{n^2+6n+10}{(2n+1)!}$ is equal to

(A) $\frac{41}{8}e + \frac{19}{8}e^{-1} + 10$
(B) $\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$
(C) $-\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$
(D) $\frac{41}{8}e - \frac{19}{8}e^{-1} - 10$

Answer: (D) $\frac{41}{8}e - \frac{19}{8}e^{-1} - 10$ · Key from source paper

Q200 JEE Main 2021 · 26 Feb · Shift 2 MCQ

If $0 < a, b < 1$, and $\tan^{-1} a + \tan^{-1} b = \frac{\pi}{4}$, then the value of $(a+b) - \left(\frac{a^2+b^2}{2}\right) + \left(\frac{a^3+b^3}{3}\right) - \left(\frac{a^4+b^4}{4}\right) + \ldots$ is :

(A) $\log_e\left(\frac{e}{2}\right)$
(B) e
(C) $e^2 - 1$
(D) $\log_e 2$

Answer: (D) $\log_e 2$ · Key from source paper

Q201 JEE Main 2021 · 26 Feb · Shift 2 Numerical

If the arithmetic mean and the geometric mean of the pth and q^{th} terms of the sequence $-16, 8, -4, 2, \ldots$ satisfy the equation $4x^2 - 9x + 5 = 0$, then $p + q$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q202 JEE Main 2021 · 25 Feb · Shift 1 MCQ

If $0 < \theta, \phi < \frac{\pi}{2}, x = \sum_{n=0}^{\infty} \cos^{2n}\theta, y = \sum_{n=0}^{\infty} \sin^{2n}\phi$ and $z = \sum_{n=0}^{\infty} \cos^{2n}\theta \cdot \sin^{2n}\phi$ then :

(A) $xy - z = (x + y)z$

(B) $xy + yz + zx = z$

(C) $xy + z = (x + y)\ z$

(D) $xyz = 4$

Answer: (C) $xy + z = (x + y)\ z$ · Key from source paper

Q203 JEE Main 2021 · 25 Feb · Shift 1 Numerical

Let $A_1, A_2, A_3, \ldots..$ be squares such that for each $n \geqslant 1$, the length of the side of A_n equals the length of diagonal of A_{n+1}. If the length of A_1 is $12\ \mathrm{cm}$, then the smallest value of n for which area of A_n is less than one, is

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q204 JEE Main 2021 · 25 Feb · Shift 2 MCQ

The minimum value of $f(x) = a^{a^x} + a^{1-a^x}$, where $a, x \in R$ and $a > 0$, is equal to:

(A) $a + 1$

(B) $2a$

(C) $a + \frac{1}{a}$

(D) $2\sqrt{a}$

Answer: (D) $2\sqrt{a}$ · Key from source paper

Q205 JEE Main 2021 · 24 Feb · Shift 1 Numerical

Let $A = \{n \in N : n$ is a 3 - digit number$\}$ $B = 9k + 2 : k \in N$ and $C = 9k + l : k \in N$ for some $l 0 < l < 9$. If the sum of all the elements of the set $A \cap B \cup C$ is 274×400, then l is equal to _____.

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q206 JEE Main 2021 · 24 Feb · Shift 2 Numerical

The sum of first four terms of a geometric progression (G.P.) is $\frac{65}{12}$ and the sum of their respective reciprocals is $\frac{65}{18}$. If the product of first three terms of the G.P. is 1, and the third term is α, then 2α is _____.

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q207 JEE Main 2020 · 6 Sep · Shift 1 MCQ

Let $a,\ b,\ c,\ d$ and p be non-zero distinct real numbers such that $(a^2 + b^2 + c^2)p^2 - 2(ab + bc + cd)p + (b^2 + c^2 + d^2) = 0$. Then

(A) a, b, c are in A.P.

(B) a, c, p are in G.P.

(C) a, b, c, d are in G.P.

(D) a, b, c, d are in A.P.

Answer: (C) a, b, c, d are in G.P. · Key from source paper

Q208 JEE Main 2020 · 6 Sep · Shift 2 MCQ

The common difference of the A. P. $b_1, b_2, \ldots, b_m$ is 2 more than common difference of A. P. $a_1, a_2, \ldots, a_n$. If $a_{40} = -159$, $a_{100} = -399$ and $b_{100} = a_{70}$, then b_1 is equal to :

(A) 81

(B) -127

(C) -81

(D) 127

Answer: (C) -81 · Key from source paper

Q209 JEE Main 2020 · 5 Sep · Shift 1 MCQ

If $2^{10} + 2^9 \cdot 3^1 + 2^8 \cdot 3^2 + \ldots\ldots + 2 \cdot 3^9 + 3^{10} = S - 2^{11}$, then S is equal to

(A) $3^{11} - 2^{12}$

(B) 3^{11}

(C) $\frac{3^{11}}{2} + 2^{10}$

(D) $2 \cdot 3^{11}$

Answer: (B) 3^{11} · Key from source paper

Q210 JEE Main 2020 · 5 Sep · Shift 1 MCQ

If $3^{2\sin 2\alpha - 1}$, 14 and $3^{4 - 2\sin 2\alpha}$ are the first three terms of an A.P. for some α , then the sixth term of this A.P. is

(A) 66

(B) 81

(C) 65

(D) 78

Answer: (A) 66 · Key from source paper

Q211 JEE Main 2020 · 5 Sep · Shift 2 MCQ

If the sum of the second, third and fourth terms of a positive term G.P. is 3 and the sum of its sixth, seventh and eighth terms is 243, then the sum of the first 50 terms of this G.P. is :

(A) $\frac{1}{26}\left(3^{49}-1\right)$
(B) $\frac{1}{26}\left(3^{50}-1\right)$
(C) $\frac{2}{13}\left(3^{50}-1\right)$
(D) $\frac{1}{13}\left(3^{50}-1\right)$

Answer: (B) $\frac{1}{26}\left(3^{50}-1\right)$ · Key from source paper

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Q212 JEE Main 2020 · 4 Sep · Shift 1 MCQ

If $1+\left(1-2^2 \cdot 1\right)+\left(1-4^2 \cdot 3\right)+\left(1-6^2 \cdot 5\right)+\ldots\ldots+\left(1-20^2 \cdot 19\right)=\alpha-220\,\beta$, then an ordered pair $(\alpha,\ \beta)$ is equal to:

(A) $(10,\ 97)$
(B) $(11,\ 103)$
(C) $(10,\ 103)$
(D) $(11,\ 97)$

Answer: (B) $(11,\ 103)$ · Key from source paper

Q213 JEE Main 2020 · 4 Sep · Shift 2 MCQ

Let $a_1, a_2, \ldots, a_n$ be a given A.P. whose common difference is an integer and $S_n = a_1 + a_2 + \ldots + a_n$. If $a_1 = 1, a_n = 300$ and $15 \leq n \leq 50$, then the ordered pair $(\mathrm{S}_{n-4}, a_{n-4})$ is equal to:

(A) $(2490, 249)$
(B) $(2480, 249)$
(C) $(2480, 248)$
(D) $(2490, 248)$

Answer: (D) $(2490, 248)$ · Key from source paper

Q214 JEE Main 2020 · 3 Sep · Shift 1 MCQ

If the first term of an $A.P.$ is 3 and the sum of its first 25 terms is equal to the sum of its next 15 terms, then the common difference of this $A.P.$is

(A) $\frac{1}{6}$
(B) $\frac{1}{5}$
(C) $\frac{1}{4}$
(D) $\frac{1}{7}$

Answer: (A) $\frac{1}{6}$ · Key from source paper

Q215 JEE Main 2020 · 3 Sep · Shift 1 MCQ

The value of $(2 \cdot {}^1P_0 - 3 \cdot {}^2P_1 + 4 \cdot {}^3P_2 - \ldots\ldots\ldots$ up to 51th term$) + (\ 1! - 2! + 3! - \ldots\ldots\ldots$ up to 51th term$)$ is equal to

(A) $1-51(51)!$
(B) $1+(51)!$
(C) $1+(52)!$
(D) 1

Answer: (C) $1+(52)!$ · Key from source paper

Q216 JEE Main 2020 · 3 Sep · Shift 1 · Numerical

The value of $0.16^{\log_{2.5}\left(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+\ldots\ldots\infty\right)}$ is _____

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q217 JEE Main 2020 · 3 Sep · Shift 2 · MCQ

If the sum of the series $20+19\frac{3}{5}+19\frac{1}{5}+18\frac{4}{5}+\ldots\ldots\ldots$ up to n^{th} term is 488 and the nth term is negative, then :

(A) n^{th} term is $-4\frac{2}{5}$
(B) $n=41$
(C) n^{th} term is -4
(D) $n=60$

Answer: (C) n^{th} term is -4 · Key from source paper

Q218 JEE Main 2020 · 3 Sep · Shift 2 · Numerical

If m arithmetic means (A.Ms) and three geometric means (G.Ms) are inserted between 3 and 243 such that 4th A.M. is equal to 2nd G.M., then m is equal to:

Numerical value type: the answer is a number.

Answer: 39. · Key from source paper

Q219 JEE Main 2020 · 2 Sep · Shift 1 · MCQ

The sum of the first three terms of G.P is S and their products is 27. Then all such S lie in

(A) $(-\infty,-9]\cup[3,\infty)$
(B) $[-3,\infty)$
(C) $(-\infty,-3]\cup[9,\infty)$
(D) $(-\infty,\ 9]$

Answer: (C) $(-\infty,-3]\cup[9,\infty)$ · Key from source paper

Q220 JEE Main 2020 · 2 Sep · Shift 1 MCQ

If $|x| < 1$, $|y| < 1$ and $x \neq 1$, then the sum to infinity of the following series $(x+y) + (x^2+xy+y^2) + (x^3+x^2y+xy^2+y^3) + \ldots..$ is

(A) $\frac{x+y-xy}{(1+x)(1+y)}$
(B) $\frac{x+y+xy}{(1+x)(1+y)}$
(C) $\frac{x+y-xy}{(1-x)(1-y)}$
(D) $\frac{x+y+xy}{(1-x)(1-y)}$

Answer: (C) $\frac{x+y-xy}{(1-x)(1-y)}$ · Key from source paper

Q221 JEE Main 2020 · 2 Sep · Shift 2 MCQ

If the sum of first 11 terms of an A.P. , $a_1, a_2, a_3 \ldots..$ is $0 (a_1 \neq 0)$ then the sum of the A.P $a_1, a_3, a_5, \ldots.. a_{23}$ is ka_1 where k is equal to

(A) $-\frac{121}{10}$
(B) $\frac{121}{10}$
(C) $\frac{72}{5}$
(D) $-\frac{72}{5}$

Answer: (D) $-\frac{72}{5}$ · Key from source paper

Q222 JEE Main 2020 · 2 Sep · Shift 2 MCQ

Let S be the sum of the first 9 term of the series :
$\{x+ka\} + \{x^2+(k+2)a\} + \{x^3+(k+4)a\} + \{x^4+(k+6)a\} + \ldots$ where $a \neq 0$ and $x \neq 1$. If $S = \frac{x^{10}-x+45a(x-1)}{x-1}$, then k is equal to

(A) -5
(B) 1
(C) -3
(D) 3

Answer: (C) -3 · Key from source paper

Q223 JEE Main 2020 · 9 Jan · Shift 1 MCQ

The product $2^{\frac{1}{4}} \bullet 4^{\frac{1}{16}} \bullet 8^{\frac{1}{48}} \bullet 16^{\frac{1}{128}} \bullet \ldots$ to ∞ is equal to:

(A) $2^{\frac{1}{2}}$
(B) $2^{\frac{1}{4}}$
(C) 1
(D) 2

Answer: (A) $2^{\frac{1}{2}}$ · Key from source paper

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Q224 JEE Main 2020 · 9 Jan · Shift 2 MCQ

Let a_n be the nth term of a G.P. of positive terms. If $\sum_{n=1}^{100} a_{2n+1} = 200$ and $\sum_{n=1}^{100} a_{2n} = 100$, then $\sum_{n=1}^{200} a_n$ is equal to:

(A) 300
(B) 225
(C) 175
(D) 150

Answer: (D) 150 · Key from source paper

Q225 JEE Main 2020 · 9 Jan · Shift 2 MCQ

If $x = \sum_{n=0}^{\infty}(-1)^n \tan^{2n}\theta$ and $y = \sum_{n=0}^{\infty}\cos^{2n}\theta$, for $0 < \theta < \frac{\pi}{4}$, then:

(A) $x(1+y) = 1$
(B) $y(1-x) = 1$
(C) $y(1+x) = 1$
(D) $x(1-y) = 1$

Answer: (B) $y(1-x) = 1$ · Key from source paper

Q226 JEE Main 2020 · 9 Jan · Shift 2 Numerical

The number of terms common to the two A.P.'s $3, 7, 11, \ldots, 407$ and $2, 9, 16, \ldots, 709$ is _____.

Numerical value type: the answer is a number.

Answer: 14. · Key from source paper

Q227 JEE Main 2020 · 8 Jan · Shift 1 MCQ

Let $f : R \to R$ be such that for all $x \in R(2^{1+x} + 2^{1-x})$, $f(x)$ and $(3^x + 3^{-x})$ are in A.P., then the minimum value of $f(x)$ is

(A) 2
(B) 3
(C) 0
(D) 4

Answer: (B) 3 · Key from source paper

Q228 JEE Main 2020 · 8 Jan · Shift 1 Numerical

The sum $\sum_{k=1}^{20}(1 + 2 + 3 + \ldots + k)$ is _____.

Numerical value type: the answer is a number.

Answer: 1540. · Key from source paper

Q229 JEE Main 2020 · 8 Jan · Shift 2 MCQ

If the 10th, term of an A.P. is $\frac{1}{20}$, and its 20th, term is $\frac{1}{10}$, then the sum of its first 200, terms is.

(A) 50
(B) $50\frac{1}{4}$
(C) 100
(D) $100\frac{1}{2}$

Answer: (D) $100\frac{1}{2}$ · Key from source paper

Q230 JEE Main 2020 · 8 Jan · Shift 2 Numerical

The sum, $\sum_{n=1}^{7} \frac{n(n+1)(2n+1)}{4}$, is equal to

Numerical value type: the answer is a number.

Answer: 504. · Key from source paper

Q231 JEE Main 2020 · 7 Jan · Shift 1 MCQ

Five numbers are in A. P. , whose sum is 25 and product is 2520. If one of these five numbers is $-\frac{1}{2}$, then the greatest number amongst them is

(A) 27
(B) 7
(C) $\frac{21}{2}$
(D) 16

Answer: (D) 16 · Key from source paper

Q232 JEE Main 2020 · 7 Jan · Shift 1 MCQ

The greatest positive integer k, for which $49^k + 1$ is a factor of the sum $49^{125} + 49^{124} + \ldots + 49^2 + 49 + 1$, is

(A) 32
(B) 63
(C) 60
(D) 35

Answer: (B) 63 · Key from source paper

Q233 JEE Main 2020 · 7 Jan · Shift 2 MCQ

Let $a_1, a_2, a_3, \ldots$, be a G. P. such that $a_1 < 0$, $a_1 + a_2 = 4$ and $a_3 + a_4 = 16$. If $\sum_{i=1}^{9} a_i = 4\lambda$, then λ, is equal to.

(A) -513
(B) -171
(C) 171
(D) $\frac{511}{3}$

Answer: (B) -171 · Key from source paper

Q234 JEE Main 2020 · 7 Jan · Shift 2 MCQ

If the sum of the first 40 terms of the series, $3+4+8+9+13+14+18+19+\ldots$. is $(102)\mathrm{m}$, then m is equal to

(A) 20
(B) 25
(C) 5
(D) 10

Answer: (A) 20 · Key from source paper

Q235 JEE Main 2019 · 12 Apr · Shift 1 MCQ

If α and β are the roots of the equation $375\ x^2-25x-2=0$, then $\lim_{n\to\infty}\sum_{r=1}^{n}\alpha^r+\lim_{n\to\infty}\sum_{r=1}^{n}\beta^r$ is equal to:

(A) $\frac{1}{12}$
(B) $\frac{21}{346}$
(C) $\frac{7}{116}$
(D) $\frac{29}{358}$

Answer: (A) $\frac{1}{12}$ · Key from source paper

Q236 JEE Main 2019 · 12 Apr · Shift 1 MCQ

Let S_n denote the sum of the first n terms of an $A.P.$. If $S_4=16$ and $S_6=-48$, then S_{10} is equal to:

(A) -320
(B) -380
(C) -260
(D) -410

Answer: (A) -320 · Key from source paper

Q237 JEE Main 2019 · 12 Apr · Shift 2 MCQ

If $a_1, a_2, a_3, \ldots$. are in A.P. such that $a_1+a_7+a_{16}=40$, then the sum of the first 15 terms of this A.P is:

(A) 280
(B) 120
(C) 150
(D) 200

Answer: (D) 200 · Key from source paper

Q238 JEE Main 2019 · 10 Apr · Shift 1 MCQ

If $a_1, a_2, a_3 \ldots\ldots\ldots, a_n$ are in A. P. and $a_1 + a_4 + a_7 \ldots\ldots\ldots + a_{16} = 114$, then $a_1 + a_6 + a_{11} + a_{16}$ is equal to :

(A) 64
(B) 98
(C) 38
(D) 76

Answer: (D) 76 · Key from source paper

Q239 JEE Main 2019 · 10 Apr · Shift 1 MCQ

The sum $\frac{3\times1^3}{1^2} + \frac{5\times\left(1^3+2^3\right)}{1^2+2^2} + \frac{7\times\left(1^3+2^3+3^3\right)}{1^2+2^2+3^2} + \ldots\ldots$ upto 10th term is

(A) 660
(B) 600
(C) 620
(D) 680

Answer: (A) 660 · Key from source paper

Q240 JEE Main 2019 · 10 Apr · Shift 2 MCQ

The sum $1 + \frac{1^3+2^3}{1+2} + \frac{1^3+2^3+3^3}{1+2+3} + \ldots + \frac{1^3+2^3+3^3+\ldots+15^3}{1+2+3+\ldots+15} - \frac{1}{2}\,1+2+3+\ldots+15$ is equal to

(A) 620
(B) 1240
(C) 1860
(D) 660

Answer: (A) 620 · Key from source paper

Q241 JEE Main 2019 · 10 Apr · Shift 2 MCQ

Let $a_1,\ a_2,\ a_3 \ldots$ be an $A.P.$ with $a_6 = 2$. Then, the common difference of this $A.P.$, which maximise the product $a_1 \cdot a_4 \cdot a_5$, is :

(A) $\frac{2}{3}$
(B) $\frac{3}{2}$
(C) $\frac{6}{5}$
(D) $\frac{8}{5}$

Answer: (D) $\frac{8}{5}$ · Key from source paper

Q242 JEE Main 2019 · 10 Apr · Shift 2 MCQ

Let $a,\ b$ and c be in $G.P.$ with common ratio r, where $a \neq 0$ and $0 < r \leq \frac{1}{2}$. If $3a,\ 7b$ and $15c$ are the first three terms of an $A.P.$, then the 4th term of this $A.P.$ is :

(A) a
(B) $\frac{7}{3}a$
(C) $5a$
(D) $\frac{2}{3}a$

Answer: (A) a · Key from source paper

Q243 JEE Main 2019 · 9 Apr · Shift 1 MCQ

Let the sum of the first n terms of a non-constant $A.P.$, $a_1, a_2, a_3, \ldots, a_n$ be $50n + \frac{n(n-7)}{2}A$, where A is a constant. If d is the common difference of this $A.P.$, then the ordered pair (d, a_{50}) is equal to

(A) $(50,\ 50 + 46A)$
(B) $(A,\ 50 + 45A)$
(C) $(50,\ 50 + 45A)$
(D) $(A,\ 50 + 46A)$

Answer: (D) $(A,\ 50 + 46A)$ · Key from source paper

Q244 JEE Main 2019 · 9 Apr · Shift 2 MCQ

The sum of the series $1 + 2 \times 3 + 3 \times 5 + 4 \times 7 + \ldots$ upto 11th term is:

(A) 945
(B) 916
(C) 946
(D) 915

Answer: (C) 946 · Key from source paper

Q245 JEE Main 2019 · 9 Apr · Shift 2 MCQ

Some identical balls are arranged in rows to form an equilateral triangle. The first row consists of one ball, the second row consists of two balls and so on. If 99 more identical balls are added to the total number of balls used in forming the equilateral triangle, then all these balls can be arranged in a

square, whose each side contains exactly 2 balls less than the number of balls each side of the triangle contains. Then the number of balls used to form the equilateral triangle is

(A) 262
(B) 190
(C) 225
(D) 157

Answer: (B) 190 · Key from source paper

Q246 JEE Main 2019 · 9 Apr · Shift 2 MCQ

If the sum and product of the first three terms in an $A.P.$ are 33 and 1155, respectively, then a value of its 11th term is:

(A) -25
(B) -35
(C) 25
(D) -36

Answer: (A) -25 · Key from source paper

Q247 JEE Main 2019 · 8 Apr · Shift 2 MCQ

The sum $\sum_{k=1}^{20} k\frac{1}{2^k}$ is equal to

(A) $1-\frac{11}{2^{20}}$
(B) $2-\frac{21}{2^{20}}$
(C) $2-\frac{3}{2^{17}}$
(D) $2-\frac{11}{2^{19}}$

Answer: (D) $2-\frac{11}{2^{19}}$ · Key from source paper

Q248 JEE Main 2019 · 12 Jan · Shift 1 MCQ

Let $S_k=\frac{1+2+3+\ldots+k}{k}$. If $S_1^2+S_2^2+\ldots+S_{10}^2=\frac{5}{12}A$, then A is equal to :

(A) 301
(B) 303
(C) 156
(D) 283

Answer: (B) 303 · Key from source paper

Q249 JEE Main 2019 · 12 Jan · Shift 1 MCQ

The product of three consecutive terms of a $G.P.$ is 512. If 4 is added to each of the first and the second of these terms, the three terms now form an $A.P.$, then the sum of the original three terms of the given $G.P.$ is :

(A) 28
(B) 24
(C) 32
(D) 36

Answer: (A) 28 · Key from source paper

Q250 JEE Main 2019 · 12 Jan · Shift 2 MCQ

If the sum of the first 15 terms of the series $\left(\frac{3}{4}\right)^3 + \left(1\frac{1}{2}\right)^3 + \left(2\frac{1}{4}\right)^3 + 3^3 + \left(3\frac{3}{4}\right)^3 + \ldots$ is equal to 225K, then K is equal to :

(A) 9
(B) 27
(C) 54
(D) 108

Answer: (B) 27 · Key from source paper

Q251 JEE Main 2019 · 11 Jan · Shift 1 MCQ

Let $a_1, a_2, ..., a_{10}$ be a G.P. If $\frac{a_3}{a_1} = 25$, then $\frac{a_9}{a_5}$ equals :

(A) 5^4
(B) $4\left(5^2\right)$
(C) 5^3
(D) $2\left(5^2\right)$

Answer: (A) 5^4 · Key from source paper

Q252 JEE Main 2019 · 11 Jan · Shift 1 MCQ

The sum of an infinite geometric series with positive terms is 3 and the sum of the cubes of its terms is $\frac{27}{19}$. Then the common ratio of this series is:

(A) $\frac{1}{3}$
(B) $\frac{2}{3}$
(C) $\frac{2}{9}$
(D) $\frac{4}{9}$

Answer: (B) $\frac{2}{3}$ · Key from source paper

Q253 JEE Main 2019 · 11 Jan · Shift 2 MCQ

Let α and β be the roots of the quadratic equation $x^2 \sin\theta - x(\sin\theta\cos\theta + 1) + \cos\theta = 0$ $(0 < \theta < 45^\circ)$, and $\alpha < \beta$. Then $\sum_{n=0}^{\infty}\left(\alpha^n + \frac{(-1)^n}{\beta^n}\right)$ is equal to :

(A) $\frac{1}{1-\cos\theta}-\frac{1}{1+\sin\theta}$
(B) $\frac{1}{1+\cos\theta}+\frac{1}{1-\sin\theta}$
(C) $\frac{1}{1-\cos\theta}+\frac{1}{1+\sin\theta}$
(D) $\frac{1}{1+\cos\theta}-\frac{1}{1-\sin\theta}$

Answer: (C) $\frac{1}{1-\cos\theta}+\frac{1}{1+\sin\theta}$ · Key from source paper

Q254 JEE Main 2019 · 11 Jan · Shift 2 MCQ

If 19 th term of a non-zero A.P. is zero, then its (49th term): (29th term) is:

(A) 4: 1
(B) 1: 3
(C) 3: 1
(D) 2: 1

Answer: (C) 3: 1 · Key from source paper

Q255 JEE Main 2019 · 11 Jan · Shift 2 MCQ

Let x, y be positive real numbers and m, n positive integers. The maximum value of the expression $\frac{x^m y^n}{(1+x^{2m})(1+y^{2n})}$ is :

(A) 1
(B) $\frac{1}{2}$
(C) $\frac{1}{4}$
(D) $\frac{m+n}{6mn}$

Answer: (C) $\frac{1}{4}$ · Key from source paper

Q256 JEE Main 2019 · 10 Jan · Shift 1 MCQ

The sum of all two digit positive numbers which when divided by 7 yield 2 or 5 as remainder is

(A) 1356
(B) 1365
(C) 1256
(D) 1465

Answer: (A) 1356 · Key from source paper

Q257 JEE Main 2019 · 10 Jan · Shift 1 MCQ

If $\sum_{i=1}^{20}\left(\frac{{}^{20}C_{i-1}}{{}^{20}C_i+{}^{20}C_{i-1}}\right)^3=\frac{k}{21}$, then k equals

(A) 200
(B) 100
(C) 50
(D) 400

Answer: (B) 100 · Key from source paper

Q258 JEE Main 2019 · 9 Jan · Shift 1 MCQ

If a, b and c be three distinct real numbers in G.P. and $a+b+c=xb$, then x cannot be:

(A) -3
(B) 2
(C) 4
(D) -2

Answer: (B) 2 · Key from source paper

Q259 JEE Main 2019 · 9 Jan · Shift 1 MCQ

Let $a_1, a_2, \ldots, a_{30}$ be an A.P., $S=\sum_{i=1}^{30} a_i$ and $T=\sum_{i=1}^{15} a_{(2i-1)}$. If $a_5=27$ and $S-2T=75$, then a_{10} is equal to:

(A) 52
(B) 47
(C) 42
(D) 57

Answer: (A) 52 · Key from source paper

Q260 JEE Main 2019 · 9 Jan · Shift 2 MCQ

The sum of the following series $1+6+\frac{9(1^2+2^2+3^2)}{7}+\frac{12(1^2+2^2+3^2+4^2)}{9}+\frac{15(1^2+2^2+\ldots+5^2)}{11}+$.... up to 15 terms, is:

(A) 7520
(B) 7510
(C) 7830
(D) 7820

Answer: (D) 7820 · Key from source paper

Q261 JEE Main 2019 · 9 Jan · Shift 2 MCQ

Let a, b and c be the 7th, 11th and 13th terms respectively of a non-constant A.P. . If these are also the three consecutive terms of a G.P. , then $\frac{a}{c}$ is equal to:

(A) 2
(B) $\frac{7}{13}$
(C) $\frac{1}{2}$
(D) 4

Answer: (D) 4 · Key from source paper

Q262 JEE Main 2018 · 16 Apr · Online MCQ

Let $\frac{1}{x_1}, \frac{1}{x_2}, \ldots, \frac{1}{x_n}$ ($x_i \neq 0$ for $i = 1, 2, \ldots, n$) be in A.P. such that $x_1 = 4$ and $x_{21} = 20$. If n is the least positive integer for which $x_n > 50$, then $\sum_{i=1}^{n} \left(\frac{1}{x_i}\right)$ is equal to

(A) 3
(B) $\frac{1}{8}$
(C) $\frac{13}{4}$
(D) $\frac{13}{8}$

Answer: (C) $\frac{13}{4}$ · Key from source paper

Q263 JEE Main 2018 · 16 Apr · Online MCQ

The sum of the first 20 terms of the series $1 + \frac{3}{2} + \frac{7}{4} + \frac{15}{8} + \frac{31}{16} + \ldots$ is

(A) $39 + \frac{1}{2^{19}}$
(B) $38 + \frac{1}{2^{20}}$
(C) $38 + \frac{1}{2^{19}}$
(D) $39 + \frac{1}{2^{20}}$

Answer: (C) $38 + \frac{1}{2^{19}}$ · Key from source paper

Q264 JEE Main 2018 · 15 Apr · Shift 1 MCQ

If b is the first term of an infinite G. P whose sum is five, then b lies in the interval.

(A) $(-\infty, -10)$
(B) $(10, \infty)$
(C) $(0, 10)$
(D) $(-10, 0)$

Answer: (C) $(0, 10)$ · Key from source paper

Q265 JEE Main 2018 · 15 Apr · Shift 1 MCQ

If $x_1, x_2, \ldots, x_n$ and $\frac{1}{h_1}, \frac{1}{h_2}, \ldots\ldots, \frac{1}{h_n}$ are two A.P's such that $x_3 = h_2 = 8$ and $x_8 = h_7 = 20$, then $x_5.h_{10}$ equals.

(A) 2560
(B) 2650
(C) 3200
(D) 1600

Answer: (A) 2560 · Key from source paper

Q266 JEE Main 2018 · 15 Apr · Shift 2 MCQ

Let $A_n = \left(\frac{3}{4}\right) - \left(\frac{3}{4}\right)^2 + \left(\frac{3}{4}\right)^3 - \ldots + (-1)^{n-1}\left(\frac{3}{4}\right)^n$ and $B_n = 1 - A_n$. Then, the least odd natural number p, so that $B_n > A_n$, for all $n \geq p$ is

(A) 5
(B) 7
(C) 11
(D) 9

Answer: (B) 7 · Key from source paper

Q267 JEE Main 2018 · 15 Apr · Shift 2 MCQ

If a, b, c are in A.P. and a^2, b^2, c^2 are in G.P. such that $a < b < c$ and $a + b + c = \frac{3}{4}$, then the value of a is

(A) $\frac{1}{4} - \frac{1}{3\sqrt{2}}$
(B) $\frac{1}{4} - \frac{1}{4\sqrt{2}}$
(C) $\frac{1}{4} - \frac{1}{\sqrt{2}}$
(D) $\frac{1}{4} - \frac{1}{2\sqrt{2}}$

Answer: (D) $\frac{1}{4} - \frac{1}{2\sqrt{2}}$ · Key from source paper

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Q268 JEE Main 2018 · 8 Apr · Offline MCQ

Let A be the sum of the first 20 terms and B be the sum of the first 40 terms of the series
$1^2 + 2 \cdot 2^2 + 3^2 + 2 \cdot 4^2 + 5^2 + 2 \cdot 6^2 + \ldots$
If $B - 2A = 100\lambda$, then λ is equal to :

(A) 496
(B) 232
(C) 248
(D) 464

Answer: (C) 248 · Key from source paper

Q269 JEE Main 2018 · 8 Apr · Offline MCQ

Let $a_1,\ a_2,\ a_3, \ldots\ldots, a_{49}$ be in $A.P.$ such that $\sum_{k=0}^{12} a_{4k+1} = 416$ and $a_9 + a_{43} = 66$. If $a_1^2 + a_2^2 + \ldots + a_{17}^2 = 140m$, then m is equal to:

(A) 33
(B) 66
(C) 68
(D) 34

Answer: (D) 34 · Key from source paper

Q270 JEE Main 2017 · 9 Apr · Online MCQ

If three positive numbers a, b and c are in A.P. such that $abc = 8$, then the minimum possible value of b is:

(A) $4^{\frac{2}{3}}$
(B) 2
(C) $4^{\frac{1}{3}}$
(D) 4

Answer: (B) 2 · Key from source paper

Q271 JEE Main 2017 · 9 Apr · Online MCQ

Let $S_n = \frac{1}{1^3} + \frac{1+2}{1^3+2^3} + \frac{1+2+3}{1^3+2^3+3^3} + \ldots + \frac{1+2+\ldots+n}{1^3+2^3+\ldots n^3}$. If $100\, S_n = n$, then n is equal to:

(A) 200
(B) 199
(C) 99
(D) 19

Answer: (B) 199 · Key from source paper

Q272 JEE Main 2017 · 8 Apr · Online MCQ

If the arithmetic mean of two numbers a and b, $a > b > 0$, is five times their geometric mean, then $\frac{a+b}{a-b}$ is equal to:

(A) $\frac{7\sqrt{3}}{12}$
(B) $\frac{3\sqrt{2}}{4}$
(C) $\frac{\sqrt{6}}{2}$
(D) $\frac{5\sqrt{6}}{12}$

Answer: (D) $\frac{5\sqrt{6}}{12}$ · Key from source paper

Q273 JEE Main 2017 · 8 Apr · Online MCQ

If the sum of the first n terms of the series $\sqrt{3}+\sqrt{75}+\sqrt{243}+\sqrt{507}+\ldots$ is $435\sqrt{3}$, then n equals:

(A) 13
(B) 15
(C) 29
(D) 18

Answer: (B) 15 · Key from source paper

Q274 JEE Main 2017 · 2 Apr · Offline MCQ

For any three positive real numbers a, b and c. If $9(25a^2+b^2)+25(c^2-3ac)=15b(3a+c)$. Then

(A) $b,\ c$ and a are in G.P.
(B) $b,\ c$ and a are in A.P.
(C) $a,\ b$ and c are in A.P.
(D) $a,\ b$ and c are in G.P.

Answer: (B) $b,\ c$ and a are in A.P. · Key from source paper

Q275 JEE Main 2016 · 10 Apr · Online MCQ

Let $a_1,\ a_2,\ a_3,\ldots a_n,\ldots$,be in A.P. If $a_3+a_7+a_{11}+a_{15}=72$, then the sum of its first 17 terms is equal to :

(A) 306
(B) 204
(C) 153
(D) 612

Answer: (A) 306 · Key from source paper

Q276 JEE Main 2016 · 10 Apr · Online MCQ

The sum $\sum_{r=1}^{10}(r^2+1)\times(r!)$, is equal to:

(A) $11\ \times\ (11!)$
(B) $10\ \times\ (11!\ )$
(C) $(11)!$
(D) $101\ \times\ (10!)$

Answer: (B) $10\ \times\ (11!\ )$ · Key from source paper

Q277 JEE Main 2016 · 9 Apr · Online MCQ

Let $x,\ y,\ z$ be positive real numbers such that $x+y+z=12$ and $x^3y^4z^5=(0.1)(600)^3$. Then $x^3+y^3+z^3$ is equal to

(A) 342
(B) 216
(C) 258
(D) 270

Answer: (B) 216 · Key from source paper

Q278 JEE Main 2016 · 9 Apr · Online MCQ

The value of $\sum_{r=1}^{15} r^2 \left(\frac{^{15}C_r}{^{15}C_{r-1}}\right)$ is equal to:

(A) 1240
(B) 560
(C) 1085
(D) 680

Answer: (D) 680 · Key from source paper

Q279 JEE Main 2016 · 3 Apr · Offline MCQ

If the 2nd, 5th and 9th terms of a non-constant arithmetic progression are in geometric progression, then the common ratio of this geometric progression is

(A) 1
(B) $\frac{7}{4}$
(C) $\frac{8}{5}$
(D) $\frac{4}{3}$

Answer: (D) $\frac{4}{3}$ · Key from source paper

Q280 JEE Main 2016 · 3 Apr · Offline MCQ

If the sum of the first ten terms of the series $\left(1\frac{3}{5}\right)^2 + \left(2\frac{2}{5}\right)^2 + \left(3\frac{1}{5}\right)^2 + 4^2 + \left(4\frac{4}{5}\right)^2 + \ldots$, is $\frac{16}{5}m$, then m is equal to

(A) 100
(B) 99
(C) 102
(D) 101

Answer: (D) 101 · Key from source paper

Q281 JEE Main 2015 · 11 Apr · Online MCQ

The sum of the 3rd and the 4th terms of a G.P. is 60 and the product of its first three terms is 1000. If the first term of this G.P. is positive, then its 7th term is:

(A) 320
(B) 640
(C) 2430
(D) 7290

Answer: (A) 320 · Key from source paper

Q282 JEE Main 2015 · 11 Apr · Online MCQ

If $\sum_{n=1}^{5} \frac{1}{n(n+1)(n+2)(n+3)} = \frac{k}{3}$, then k is equal to:

(A) $\frac{55}{336}$
(B) $\frac{17}{105}$
(C) $\frac{19}{112}$
(D) $\frac{1}{6}$

Answer: (A) $\frac{55}{336}$ · Key from source paper

Q283 JEE Main 2015 · 10 Apr · Online MCQ

The value of $\sum_{r=16}^{30}(r+2)(r-3)$ is equal to:

(A) 7775
(B) 7785
(C) 7780
(D) 7770

Answer: (C) 7780 · Key from source paper

Q284 JEE Main 2015 · 10 Apr · Online MCQ

Let the sum of the first three terms of an A.P. be 39 and the sum of its last four terms be 178. If the first term of this A.P. is 10, then the median of the A.P. is :

(A) 26.5
(B) 29.5
(C) 28
(D) 31

Answer: (B) 29.5 · Key from source paper

Q285 JEE Main 2015 · 4 Apr · Offline MCQ

The sum of first 9 terms of the series $\frac{1^3}{1} + \frac{1^3+2^3}{1+3} + \frac{1^3+2^3+3^3}{1+3+5} + \ldots$ is

(A) 192
(B) 71
(C) 96
(D) 142

Answer: (C) 96 · Key from source paper

Q286 JEE Main 2015 · 4 Apr · Offline MCQ

If m is the $A.M.$ of two distinct real numbers l and n $(l,\ n > 1)$ and G_1, G_2 and G_3 are three geometric means between l and n, then $G_1^4 + 2G_2^4 + G_3^4$ equals

(A) $4l^2m^2n^2$
(B) $4\,l^2mn$
(C) $4\,lm^2\,n$
(D) $4lmn^2$

Answer: (C) $4\,lm^2\,n$ · Key from source paper

Q287 JEE Main 2014 · 19 Apr · Online MCQ

The number of terms in an $A.P.$ is even, the sum of the odd terms in it is 24 and that the even terms is 30. If the last term exceeds the first term by $10\frac{1}{2}$, then the number of terms in the $A.P.$ is

(A) 4
(B) 8
(C) 16
(D) 12

Answer: (B) 8 · Key from source paper

Q288 JEE Main 2014 · 12 Apr · Online MCQ

Let G be the geometric mean of two positive numbers a and b, and M be the arithmetic mean of $\frac{1}{a}$ and $\frac{1}{b}$. If $\frac{1}{M}$: G is 4 : 5, then a : b can be:

(A) $1:4$
(B) $1:2$
(C) $2:3$
(D) $3:4$

Answer: (A) $1:4$ · Key from source paper

Q289 JEE Main 2014 · 12 Apr · Online MCQ

The least positive integer n such that $1-\frac{2}{3}-\frac{2}{3^2}-\ldots\ldots-\frac{2}{3^{n-1}}<\frac{1}{100}$, is:

(A) 4
(B) 5
(C) 6
(D) 7

Answer: (C) 6 · Checked by our team

Q290 JEE Main 2014 · 11 Apr · Online MCQ

In a geometric progression, if the ratio of the sum of first 5 terms to the sum of their reciprocals is 49 , and the sum of the first and the third term is 35. Then the first term of this geometric progression is:

(A) 7
(B) 21
(C) 28
(D) 42

Answer: (C) 28 · Key from source paper

Q291 JEE Main 2014 · 11 Apr · Online MCQ

The sum of the first 20 terms common between the series $3+7+11+15+$ and $1+6+11+16+$ ..... is

(A) 4000
(B) 4020
(C) 4200
(D) 4220

Answer: (B) 4020 · Key from source paper

Q292 JEE Main 2014 · 9 Apr · Online MCQ

Given an A.P. whose terms are all positive integers. The sum of its first nine terms is greater than 200 and less than 220. If the second term in it is 12, then its 4th term is :

(A) 8
(B) 24
(C) 20
(D) 16

Answer: (C) 20 · Key from source paper

Q293 JEE Main 2014 · 9 Apr · Online MCQ

If the sum $\frac{3}{1^2}+\frac{5}{1^2+2^2}+\frac{7}{1^2+2^2+3^2}+\ldots\ldots+$ up to 20 terms is equal to $\frac{k}{21}$, then k is equal to

(A) 240
(B) 120
(C) 60
(D) 180

Answer: (B) 120 · Key from source paper

Q294 JEE Main 2014 · 6 Apr · Offline MCQ

If $(10)^9 + 2(11)^1(10)^8 + 3(11)^2(10)^7 + \ldots\ldots + 10(11)^9 = k(10)^9$, then k is equal to :

(A) 100
(B) 110
(C) $\frac{121}{10}$
(D) $\frac{441}{100}$

Answer: (A) 100 · Key from source paper

Q295 JEE Main 2014 · 6 Apr · Offline MCQ

Three positive numbers form an increasing G. P. If the middle term in this G. P. is doubled, the new numbers are in A. P. Then the common ratio of the G. P. is :

(A) $2 - \sqrt{3}$
(B) $2 + \sqrt{3}$
(C) $\sqrt{2} + \sqrt{3}$
(D) $3 + \sqrt{2}$

Answer: (B) $2 + \sqrt{3}$ · Key from source paper

Q296 JEE Main 2013 · 25 Apr · Online MCQ

Given a sequence of 4 numbers, first three of which are in G.P. and the last three are in A.P. with common difference six. If first and last terms of this sequence are equal, then the last term is :

(A) 16
(B) 8
(C) 4
(D) 2

Answer: (B) 8 · Key from source paper

Q297 JEE Main 2013 · 25 Apr · Online MCQ

The value of $1^2 + 3^2 + 5^2 + \ldots\ldots + 25^2$ is :

(A) 2925
(B) 1469
(C) 1728
(D) 1456

Answer: (A) 2925 · Key from source paper

Q298 JEE Main 2013 · 23 Apr · Online MCQ

The sum of the series : $(2)^2 + 2(4)^2 + 3(6)^2 + \ldots$ upto 10 terms is :

(A) 11300
(B) 11200
(C) 12100
(D) 12300

Answer: (C) 12100 · Key from source paper

Q299 JEE Main 2013 · 23 Apr · Online MCQ

If $a_1, a_2, a_3, \ldots, a_n, \ldots$ are in A.P. such that $a_4 - a_7 + a_{10} = m$, then the sum of first 13 terms of this A.P., is :

(A) 10 m
(B) 12 m
(C) 13 m
(D) 15 m

Answer: (C) 13 m · Key from source paper

Q300 JEE Main 2013 · 22 Apr · Online MCQ

Given sum of the first n terms of an A.P. is $2n + 3n^2$. Another A.P. is formed with the same first term and double of the common difference, the sum of n terms of the new A.P. is :

(A) $n + 4n^2$
(B) $6n^2 - n$
(C) $n^2 + 4n$
(D) $3n + 2n^2$

Answer: (B) $6n^2 - n$ · Key from source paper

Q301 JEE Main 2013 · 22 Apr · Online MCQ

The sum $\frac{3}{1^2} + \frac{5}{1^2+2^2} + \frac{7}{1^2+2^2+3^2} + \ldots$ upto 11-terms is:

(A) $\frac{7}{2}$
(B) $\frac{11}{4}$
(C) $\frac{11}{2}$
(D) $\frac{60}{11}$

Answer: (C) $\frac{11}{2}$ · Key from source paper

Q302 JEE Main 2013 · 9 Apr · Online MCQ

The sum of the series: $1+\frac{1}{1+2}+\frac{1}{1+2+3}+\ldots\ldots$ upto 10 terms, is:

(A) $\frac{18}{11}$
(B) $\frac{22}{13}$
(C) $\frac{20}{11}$
(D) $\frac{16}{9}$

Answer: (C) $\frac{20}{11}$ · Key from source paper

Q303 JEE Main 2013 · 7 Apr · Offline MCQ

The sum of first 20 terms of the sequence 0.7, 0.77, 0.777, ..., is :

(A) $\frac{7}{81}\left(179+10^{-20}\right)$
(B) $\frac{7}{9}\left(99+10^{-20}\right)$
(C) $\frac{7}{81}\left(179-10^{-20}\right)$
(D) $\frac{7}{9}\left(99-10^{-20}\right)$

Answer: (A) $\frac{7}{81}\left(179+10^{-20}\right)$ · Key from source paper

Q304 AIEEE 2012 · 26 May · Online MCQ

If the A.M. between p^{th} and q^{th} terms of an A.P. is equal to the A.M. between r^{th} and s^{th} terms of the same A.P., then $p+q$ is equal to

(A) $r+s-1$
(B) $r+s-2$
(C) $r+s+1$
(D) $r+s$

Answer: (D) $r+s$ · Key from source paper

Q305 AIEEE 2012 · 26 May · Online MCQ

If the sum of the series $1^2+2\cdot 2^2+3^2+2\cdot 4^2+5^2+\ldots 2\cdot 6^2+\ldots$ upto n terms, when n is even, is $\frac{n(n+1)^2}{2}$, then the sum of the series, when n is odd, is

(A) $n^2(n+1)$
(B) $\frac{n^2(n-1)}{2}$
(C) $\frac{n^2(n+1)}{2}$
(D) $n^2(n-1)$

Answer: (C) $\frac{n^2(n+1)}{2}$ · Key from source paper

Q306

AIEEE 2012 · 12 May · Online · MCQ

If a, b, c, d and p are distinct real numbers such that $(a^2+b^2+c^2)p^2 - 2p(ab+bc+cd) + (b^2+c^2+d^2) \leq 0$, then

(A) a, b, c, d are in A.P.
(B) $ab = cd$
(C) $ac = bd$
(D) a, b, c, d are in G.P.

Answer: (D) a, b, c, d are in G.P. · Key from source paper

Q307

AIEEE 2012 · 12 May · Online · MCQ

The sum of the series

$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \ldots$$

upto 15 terms is

(A) 1
(B) 2
(C) 3
(D) 4

Answer: (C) 3 · Key from source paper

Q308

AIEEE 2012 · 7 May · Online · MCQ

The difference between the fourth term and the first term of a Geometrical Progresssion (sic) is 52. If the sum of its first three terms is 26 , then the sum of the first six terms of the progression is

(A) 63
(B) 189
(C) 728
(D) 364

Answer: (C) 728 · Key from source paper

Q309 AIEEE 2012 · 7 May · Online MCQ

The sum of the series $1^2 + 2.2^2 + 3^2 + 2.4^2 + 5^2 + 2.6^2 + ... + 2(2m)^2$ is

(A) $m(2m+1)^2$
(B) $m^2(m+2)$
(C) $m^2(2m+1)$
(D) $m(m+2)^2$

Answer: (A) $m(2m+1)^2$ · Key from source paper

Q310 AIEEE 2012 · Offline MCQ

Statement 1: The sum of the series $1 + (1+2+4) + (4+6+9) + (9+12+16) + ... + (361 + 380 + 400)$ is 8000. Statement 2: $\sum_{k=1}^{n}(k^3 - (k-1)^3) = n^3$ for any natural number n.

(A) Statement 1 is false, statement 2 is true.
(B) Statement 1 is true, statement 2 is true; statement 2 is a correct explanation for statement 1
(C) Statement 1 is true, statement 2 is true; statement 2 is not a correct explanation for statement 1
(D) Statement 1 is true, statement 2 is false

Answer: (B) Statement 1 is true, statement 2 is true; statement 2 is a correct explanation for statement 1 · Key from source paper

Q311 AIEEE 2012 · Offline MCQ

If 100 times the 100th term of an AP with non zero common difference equals the 50 times its 50th term, then the 150th term of this AP is

(A) -150
(B) 150 times its 50th term
(C) 150
(D) zero

Answer: (D) zero · Key from source paper

Q312 AIEEE 2011 MCQ

A man saves Rs. 200 in each of the first three months of his service. In each of the subsequent months his saving increases by Rs. 40 more than the saving of immediately previous month. His total saving from the start of service will be Rs. 11040 after

(A) 19 months
(B) 20 months
(C) 21 months
(D) 18 months

Answer: (C) 21 months · Key from source paper

Q313 AIEEE 2010 MCQ

A person is to count 4500 currency notes. Let a_n denote the number of notes he counts in the nth minute. If $\mathrm{a}_1 = \mathrm{a}_2 = \ldots\ldots = \mathrm{a}_{10} = 150$ and $\mathrm{a}_{10}, \mathrm{a}_{11}, \ldots\ldots$ are in A.P. with common difference -2, then the time taken by him to count all notes is

(A) 34 minutes
(B) 125 minutes
(C) 135 minutes
(D) 24 minutes

Answer: (A) 34 minutes · Key from source paper

Q314 AIEEE 2009 MCQ

The sum to the infinity of the series $1 + \frac{2}{3} + \frac{6}{3^2} + \frac{10}{3^3} + \frac{14}{3^4} + \ldots\ldots$ is

(A) 2
(B) 3
(C) 4
(D) 6

Answer: (B) 3 · Key from source paper

Q315 AIEEE 2008 MCQ

The first two terms of a geometric progression add up to 12. The sum of the third and the fourth terms is 48. If the terms of the geometric progression are alternately positive and negative, then the first term is

(A) -4
(B) -12
(C) 12
(D) 4

Answer: (B) -12 · Key from source paper

Q316 AIEEE 2007 MCQ

In a geometric progression consisting of positive terms, each term equals the sum of the next two terms. Then the common ratio of this progression equals

(A) $\frac{1}{2}(1 - \sqrt{5})$
(B) $\frac{1}{2}\sqrt{5}$
(C) $\sqrt{5}$
(D) $\frac{1}{2}(\sqrt{5} - 1)$

Answer: (D) $\frac{1}{2}(\sqrt{5} - 1)$ · Key from source paper

EdLoop JEE

Q317 AIEEE 2007 MCQ

If p and q are positive real numbers such that $p^2 + q^2 = 1$, then the maximum value of $(p + q)$ is

(A) 2
(B) 1/2
(C) $\frac{1}{\sqrt{2}}$
(D) $\sqrt{2}$

Answer: (D) $\sqrt{2}$ · Key from source paper

Q318 AIEEE 2007 MCQ

The sum of the series $\frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \ldots$ upto infinity is

(A) e^{-2}
(B) e^{-1}
(C) $\mathrm{e}^{-1/2}$
(D) $\mathrm{e}^{1/2}$

Answer: (B) e^{-1} · Key from source paper

Q319 AIEEE 2006 MCQ

Let $a_1, a_2, a_3, \ldots$ be terms of an A.P. If $\frac{a_1+a_2+\cdots+a_p}{a_1+a_2+\cdots+a_q} = \frac{p^2}{q^2}$, $p \neq q$, then $\frac{a_6}{a_{21}}$ equals

(A) $\frac{41}{11}$
(B) $\frac{7}{2}$
(C) $\frac{2}{7}$
(D) $\frac{11}{41}$

Answer: (D) $\frac{11}{41}$ · Key from source paper

Q320 AIEEE 2006 MCQ

If $a_1, a_2, \ldots, a_n$ are in H.P., then the expression $a_1a_2 + a_2a_3 + \ldots + a_{n-1}a_n$ is equal to

(A) $n\,(a_1 - a_n)$
(B) $(n-1)\,(a_1 - a_n)$
(C) na_1a_n
(D) $(n-1)a_1a_n$

Answer: (D) $(n-1)a_1a_n$ · Key from source paper

Q321 AIEEE 2005 MCQ

If $x = \sum_{n=0}^{\infty} a^n,\ y = \sum_{n=0}^{\infty} b^n,\ z = \sum_{n=0}^{\infty} c^n$ where a, b, c are in A.P. and $|a| < 1,\ |b| < 1,\ |c| < 1$, then x, y, z are in

(A) G.P.

(B) A.P.

(C) Arithmetic - Geometric Progression

(D) H.P.

Answer: (D) H.P. · Key from source paper

Q322 AIEEE 2005 MCQ

The sum of the series $1+\frac{1}{4\cdot 2!}+\frac{1}{16\cdot 4!}+\frac{1}{64\cdot 6!}+\ldots\ldots\ldots$ ad inf. is

(A) $\frac{e-1}{\sqrt{e}}$

(B) $\frac{e+1}{\sqrt{e}}$

(C) $\frac{e-1}{2\sqrt{e}}$

(D) $\frac{e+1}{2\sqrt{e}}$

Answer: (D) $\frac{e+1}{2\sqrt{e}}$ · Key from source paper

Q323 AIEEE 2004 MCQ

Let T_r be the rth term of an A.P. whose first term is a and common difference is d. If for some positive integers m, n, $m \neq n$, $T_m = \frac{1}{n}$ and $T_n = \frac{1}{m}$, then $a - d$ equals

(A) 0

(B) 1

(C) $\frac{1}{mn}$

(D) $\frac{1}{m}+\frac{1}{n}$

Answer: (A) 0 · Key from source paper

Q324 AIEEE 2004 MCQ

The sum of the first n terms of the series $1^2+2\cdot 2^2+3^2+2\cdot 4^2+5^2+2\cdot 6^2+\ldots$ is $\frac{n(n+1)^2}{2}$ when n is even. When n is odd the sum is

(A) $\frac{3n(n+1)}{2}$

(B) $\frac{n^2(n+1)}{2}$

(C) $\frac{n(n+1)^2}{4}$

(D) $\left[\frac{n(n+1)}{2}\right]^2$

Answer: (B) $\frac{n^2(n+1)}{2}$ · Key from source paper

Q325 AIEEE 2004 MCQ

The sum of series $\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\ldots$ is

(A) $\frac{(e^2-1)}{2}$
(B) $\frac{(e-1)^2}{2e}$
(C) $\frac{(e^2-1)}{2e}$
(D) $\frac{(e^2-2)}{e}$

Answer: (B) $\frac{(e-1)^2}{2e}$ · Key from source paper

Q326 AIEEE 2003 MCQ

If x_1, x_2, x_3 and y_1, y_2, y_3 are both in G.P. with the same common ratio, then the points (x_1, y_1), (x_2, y_2) and (x_3, y_3)

(A) are vertices of a triangle
(B) lie on a straight line
(C) lie on an ellipse
(D) lie on a circle

Answer: (B) lie on a straight line · Key from source paper

Q327 AIEEE 2003 MCQ

Let $f(x)$ be a polynomial function of second degree. If $f(1) = f(-1)$ and a, b, c are in A.P, then $f'(a), f'(c)$ are in

(A) Arithmetic-Geometric Progression
(B) A.P.
(C) G.P.
(D) H.P.

Answer: (B) A.P. · Key from source paper

Q328 AIEEE 2003 MCQ

The sum of the series $\frac{1}{1.2} - \frac{1}{2.3} + \frac{1}{3.4} - \ldots\ldots\ldots\ldots$ up to ∞ is equal to

(A) $\log_e\left(\frac{4}{e}\right)$
(B) $2\log_e 2$
(C) $\log_e 2 - 1$
(D) $\log_e 2$

Answer: (A) $\log_e\left(\frac{4}{e}\right)$ · Key from source paper

Q329 AIEEE 2002 MCQ

If a, b, c are distinct $+ve$ real numbers and $a^2 + b^2 + c^2 = 1$ then $ab + bc + ca$ is

(A) less than 1
(B) equal to 1
(C) greater than 1
(D) any real no.

Answer: (A) less than 1 · Key from source paper

Q330 AIEEE 2002 MCQ

The value of $2^{1/4} \cdot 4^{1/8} \cdot 8^{1/16} \cdots \infty$ is

(A) 1
(B) 2
(C) 3/2
(D) 4

Answer: (B) 2 · Key from source paper

Q331 AIEEE 2002 MCQ

Fifth term of a GP is 2, then the product of its 9 terms is

(A) 256
(B) 512
(C) 1024
(D) none of these

Answer: (B) 512 · Key from source paper

Q332 AIEEE 2002 MCQ

Sum of infinite number of terms of GP is 20 and sum of their square is 100. The common ratio of GP is

(A) 5
(B) 3/5
(C) 8/5
(D) 1/5

Answer: (B) 3/5 · Checked by our team

Q333 AIEEE 2002 MCQ

$1^3 - 2^3 + 3^3 - 4^3 + \ldots\ldots + 9^3 =$

(A) 425
(B) -425
(C) 475
(D) -475

Answer: (A) 425 · Key from source paper

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