PrepWiser.

MATHEMATICS · JEE MAIN

Sequences & Series

Chapter-wise previous year questions, with answer key

199	2020–2025	5
PYQS	PAPERS	TOPICS

Geometric Progression · Special Sums · Arithmetico-Geometric Progression · Telescoping Series · Arithmetic Progression

1. Attempt each question on paper first — they're grouped by topic, newest papers first.
2. Check yourself against the answer key at the end.
3. Got one wrong? Tap “Step-by-step solution” under it for the full working.

Stuck on a question?

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Geometric Progression · 43 PYQs

Q1 JEE Main 2025 · 7 Apr · Shift 1

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 $\frac{1}{24}(x_1x_2x_3x_4)$ is:

(A) 18 **(B)** 216

(C) 36 **(D)** 72

Step-by-step solution ▸ prepwiser.in/questions/AegFxp7aOQ

Q2 JEE Main 2025 · 7 Apr · Shift 2

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) 757

(B) 755

(C) 750

(D) 760

Step-by-step solution ▸ prepwiser.in/questions/i3xWmvCMjQ

Q3 JEE Main 2025 · 3 Apr · Shift 1

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) 128 **(B)** 129

(C) 131 **(D)** 130

Step-by-step solution ▸ prepwiser.in/questions/xxkVOpXMhe

Q4 JEE Main 2025 · 28 Jan · Shift 1

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

(A) $3a_{100} + 100$ **(B)** $3a_{100} - 100$

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

Step-by-step solution ▸ prepwiser.in/questions/jCTx9XYbsy

Q5 JEE Main 2025 · 22 Jan · Shift 1

Let $a_1, a_2, a_3, \ldots$ be a G.P. of increasing positive terms. If $a_1a_5 = 28$ and $a_2 + a_4 = 29$, then a_6 is equal to:

(A) 812 **(B)** 784

(C) 628 **(D)** 526

Step-by-step solution ▸ prepwiser.in/questions/3N9Xe9-Azv

Q6 JEE Main 2024 · 9 Apr · Shift 2

Let $a, ar, ar^2, \ldots\ldots\ldots$ 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) 27 **(B)** 38

(C) 31 **(D)** 46

Step-by-step solution ▸ prepwiser.in/questions/kdsuzExt5A

Q7 JEE Main 2024 · 8 Apr · Shift 2

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 $4^{\text{th}}, 6^{\text{th}}$ and 8^{th} terms is equal to:

(A) 78 **(B)** 96

(C) 91 **(D)** 84

Step-by-step solution ▸ prepwiser.in/questions/pZCpzyz3GM

Q8 JEE Main 2024 · 1 Feb · Shift 2

If three successive terms of a G.P. with common ratio $\mathrm{r}(\mathrm{r} > 1)$ are the lengths of the sides of a triangle and $[r]$ denotes the greatest integer less than or equal to r, then $3[r] + [-r]$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/taANCTJwSc

Q9 JEE Main 2024 · 30 Jan · Shift 2

Let a and b be be two distinct positive real numbers. Let 11^{th} 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)** 24

(C) 21 **(D)** 25

Step-by-step solution ▸ prepwiser.in/questions/8fhp19d9T5

Q10 JEE Main 2024 · 29 Jan · Shift 1

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)** 6

(C) 5 **(D)** 4

Step-by-step solution ▸ prepwiser.in/questions/kpvBAWOBdk

Q11 JEE Main 2024 · 29 Jan · Shift 2

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 $S_n = a_1 + a_2 + \ldots\ldots + a_n$, then $S_{20} - S_{18}$ is equal to

(A) -2^{15} **(B)** 2^{15}

(C) -2^{18} **(D)** 2^{18}

Step-by-step solution ▸ prepwiser.in/questions/zOOmjact5u

Q12 JEE Main 2023 · 15 Apr · Shift 1

Let A_1 and A_2 be two arithmetic means and G_1, G_2, G_3 be three geometric

means of two distinct positive numbers. Then $G_1^4 + G_2^4 + G_3^4 + G_1^2 G_3^2$ is equal to :

(A) $(A_1 + A_2)^2 G_1 G_3$

(B) $(A_1 + A_2) G_1^2 G_3^2$

(C) $2(A_1 + A_2) G_1^2 G_3^2$

(D) $2(A_1 + A_2) G_1 G_3$

Step-by-step solution ▸ prepwiser.in/questions/VrPT7bxw9S

Q13 JEE Main 2023 · 13 Apr · Shift 2

Let a_1, a_2, a_3, ... be a G.P. of increasing positive numbers. Let the sum of its 6^{th} and 8^{th} terms be 2 and the product of its 3^{rd} and 5^{th} terms be $\frac{1}{9}$. Then $6(a_2 + a_4)(a_4 + a_6)$ is equal to

(A) $2\sqrt{2}$

(B) 2

(C) $3\sqrt{3}$

(D) 3

Step-by-step solution ▸ prepwiser.in/questions/fUYeOlvL2r

Q14 JEE Main 2023 · 12 Apr · Shift 1

Let the positive numbers a_1, a_2, a_3, a_4 and a_5 be in a G.P. Let their mean and variance be $\frac{31}{10}$ and $\frac{m}{n}$ respectively, where m and n are co-prime. If the mean of their reciprocals is $\frac{31}{40}$ and $a_3 + a_4 + a_5 = 14$, then $m + n$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/lOOVCnD1OG

Q15 JEE Main 2023 · 10 Apr · Shift 1

Let the first term α 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) 220

(D) 210

Step-by-step solution ▸ prepwiser.in/questions/S12nVtuJ5h

Q16 JEE Main 2023 · 31 Jan · Shift 1

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) 14

(C) 3

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

Step-by-step solution ▸ prepwiser.in/questions/AUn96-hrxj

Q17 JEE Main 2023 · 29 Jan · Shift 1

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/E8OZmpTS3G

Q18 JEE Main 2023 · 29 Jan · Shift 2

Let $\{a_k\}$ and $\{b_k\}, k \in N$, be two G.P.s with common ratios r_1 and r_2 respectively such that $a_1 = b_1 = 4$ and $r_1 < r_2$. Let $c_k = a_k + b_k, k \in N$. 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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/40a0a2ZU2Y

Q19 JEE Main 2023 · 25 Jan · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/23IvMTXQBr

Q20 JEE Main 2023 · 24 Jan · Shift 1

The 4$^{\text{th}}$ term of GP is 500 and its common ratio is $\frac{1}{m}, m \in \mathbb{N}$. 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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/ZGh4QpuTwn

Q21 JEE Main 2022 · 28 Jul · Shift 1

Let $x_1, x_2, x_3, \ldots, x_{20}$ be in geometric progression with $x_1 = 3$ and the common ratio $\frac{1}{2}$. A new data is constructed replacing each x_i by $(x_i - i)^2$. If $\bar{x}$ is the mean of new data, then the greatest integer less than or equal to $\bar{x}$ is _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/5r2BwZc-B6

Q22 JEE Main 2022 · 28 Jul · Shift 2

$$\frac{6}{3^{12}} + \frac{10}{3^{11}} + \frac{20}{3^{10}} + \frac{40}{3^9} + \ldots + \frac{10240}{3} = 2^n \cdot m$$

, where m is odd, then m . n is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/qe4oXYVObd

Q23 JEE Main 2022 · 26 Jul · Shift 1

Consider two G.Ps. 2, 2^2, 2^3, ... and 4, 4^2, 4^3, ... 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

Step-by-step solution ▸ prepwiser.in/questions/0judO-XHTT

Q24 JEE Main 2022 · 28 Jun · Shift 2

Let for n = 1, 2, ..., 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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/gRlr2rYuv0

Q25 JEE Main 2022 · 28 Jun · Shift 1

Let $A_1, A_2, A_3, \ldots$ 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) 33 **(B)** 37

(C) 43 **(D)** 47

Step-by-step solution ▸ prepwiser.in/questions/9OxTT1H5Ye

Q26 JEE Main 2022 · 27 Jun · Shift 1

$$x=\sum_{n=0}^{\infty}a^n, y=\sum_{n=0}^{\infty}b^n, z=\sum_{n=0}^{\infty}c^n$$

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

Step-by-step solution ▸ prepwiser.in/questions/dT0OfETWMf

Q27 JEE Main 2022 · 26 Jun · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/fSHIU1qfs8

Q28 JEE Main 2022 · 25 Jun · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/gcnBw1HDVR

Q29 JEE Main 2022 · 24 Jun · Shift 2

The remainder on dividing $1 + 3 + 3^2 + 3^3 + ... + 3^{2021}$ by 50 is _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/6OPAsZP_5P

Q30 JEE Main 2021 · 27 Aug · Shift 1

If for $x, y \in R$, $x > 0$, $y = \log_{10}x + \log_{10}x^{1/3} + \log_{10}x^{1/9} + ... \text{ upto } \infty \text{ terms}$

and

$$\frac{2 + 4 + 6 + ... + 2y}{3 + 6 + 9 + ... + 3y} = \frac{4}{\log_{10}x}$$

, then the ordered pair (x, y) is equal to :

(A) $(10^6, 6)$

(B) $(10^4, 6)$

(C) $(10^2, 3)$

(D) $(10^6, 9)$

Step-by-step solution ▸ prepwiser.in/questions/cY4eEmlZKe

Q31 JEE Main 2021 · 26 Aug · Shift 1

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

(A) $\frac{5}{2}$

(B) $\frac{1}{2}$

(C) $\frac{25}{2}$

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

Step-by-step solution ▸ prepwiser.in/questions/zrMPP_PhxD

Q32 JEE Main 2021 · 16 Mar · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/d45pcelPJl

Q33 JEE Main 2021 · 26 Feb · Shift 2

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/REhivZ6VGt

Q34 JEE Main 2021 · 26 Feb · Shift 1

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) 30 **(B)** 32

(C) 26 **(D)** 35

Step-by-step solution ▸ prepwiser.in/questions/K3WTQzARQn

Q35 JEE Main 2021 · 25 Feb · Shift 1

If

$$0 < \theta, \phi < \frac{\pi}{2}, x = \sum_{n=0}^{\infty} \cos^{2n}\theta, y = \sum_{n=0}^{\infty} \sin^{2n}\phi$$

and $z = \sum_{n=0}^{\infty} \cos^{2n}\theta . \sin^{2n}\phi$ then :

(A) xy $-$ z = (x + y)z **(B)** xyz = 4

(C) xy + z = (x + y)z **(D)** xy + yz + zx = z

Step-by-step solution ▸ prepwiser.in/questions/NLEb3Vx91W

Q36 JEE Main 2021 · 24 Feb · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/KeEbYpkInE

Q37 JEE Main 2020 · 5 Sep · Shift 2

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) $\frac{2}{13}\left(3^{50}-1\right)$

(B) $\frac{1}{13}\left(3^{50}-1\right)$

(C) $\frac{1}{26}\left(3^{49}-1\right)$

(D) $\frac{1}{26}\left(3^{50}-1\right)$

Step-by-step solution ▸ prepwiser.in/questions/3M7r888Vl6

Q38 JEE Main 2020 · 3 Sep · Shift 1

The value of

$$(0.16)^{\log_{2.5}\left(\frac{1}{3}+\frac{1}{3^2}+....to\,\infty\right)}$$

is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/vvPsrKP4H9

Q39 JEE Main 2020 · 2 Sep · Shift 1

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

(A) $[-3, \infty)$

(B) $(-\infty, 9]$

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

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

Step-by-step solution ▸ prepwiser.in/questions/GDrOS9nF_r

Q40 JEE Main 2020 · 9 Jan · Shift 2

Let a_n be the n^{th} term of a G.P. of positive terms.

$\sum_{n=1}^{100} a_{2n+1} = 200$ and $\sum_{n=1}^{100} a_{2n} = 100$,

then $\sum_{n=1}^{200} a_n$ is equal to :

(A) 150

(B) 175

(C) 225

(D) 300

Step-by-step solution ▸ prepwiser.in/questions/dy6sMYic6m

Q41 JEE Main 2020 · 7 Jan · Shift 1

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

(A) 32

(B) 60

(C) 63

(D) 65

Step-by-step solution ▸ prepwiser.in/questions/lYewvrt_Sp

Q42 JEE Main 2020 · 7 Jan · Shift 1

If the sum of the coefficients of all even powers of x in the product $(1 + x + x^2 + ...+ x^{2n})(1 - x + x^2 - x^3 + ... + x^{2n})$ is 61, then n is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/3iLdIAehT5

Q43 JEE Main 2020 · 7 Jan · Shift 2

Let a_1 , a_2 , a_3 ,..... 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) 171

(B) -171

(C) -513

(D) $\frac{511}{3}$

Step-by-step solution ▸ prepwiser.in/questions/L3PlW85OyV

Special Sums · 44 PYQs

Q44 JEE Main 2025 · 8 Apr · Shift 2

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) 23

(B) 14

(C) 18

(D) 15

Step-by-step solution ▸ prepwiser.in/questions/d0B4dqEjgn

Q45 JEE Main 2025 · 4 Apr · Shift 1

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

(A) 40870

(B) 41880

(C) 43890

(D) 33980

Step-by-step solution ▸ prepwiser.in/questions/JujNAPrKiQ

Q46 JEE Main 2025 · 3 Apr · Shift 1

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

(A) 7240

(B) 8124

(C) 7130

(D) 6982

Step-by-step solution ▸ prepwiser.in/questions/StFeXYc-jC

Q47 JEE Main 2025 · 3 Apr · Shift 2

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) $2e$

(C) $4e$

(D) $6e$

Step-by-step solution ▸ prepwiser.in/questions/rvoH7iH385

Q48 JEE Main 2025 · 24 Jan · Shift 1

Let $f(x)=\frac{2^{x+2}+16}{2^{2x+1}+2^{x+4}+32}$. Then the value of $8\left(f\left(\frac{1}{15}\right)+f\left(\frac{2}{15}\right)+\ldots+f\left(\frac{59}{15}\right)\right)$ is equal to

(A) 108

(B) 92

(C) 118

(D) 102

Step-by-step solution ▸ prepwiser.in/questions/s5S2OxD0m4

Q49 JEE Main 2024 · 9 Apr · Shift 2

Let $\alpha, \beta; \alpha > \beta$, be the roots of the equation $x^2 - \sqrt{2}x - \sqrt{3} = 0$. Let $\mathrm{P}_n = \alpha^n - \beta^n, n \in \mathrm{N}$. Then

$$(11\sqrt{3} - 10\sqrt{2})\mathrm{P}_{10} + (11\sqrt{2} + 10)\mathrm{P}_{11} - 11\mathrm{P}_{12}$$

is equal to

(A) $10\sqrt{3}\mathrm{P}_9$

(B) $11\sqrt{3}\mathrm{P}_9$

(C) $11\sqrt{2}\mathrm{P}_9$

(D) $10\sqrt{2}\mathrm{P}_9$

Step-by-step solution ▸ prepwiser.in/questions/vr0xuCV4-0

Q50 JEE Main 2024 · 5 Apr · Shift 2

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 $11\mathrm{a} + 18\mathrm{b}$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/GruZ_dch6k

Q51 JEE Main 2024 · 4 Apr · Shift 2

The value of

$$\frac{1 \times 2^2 + 2 \times 3^2 + \ldots + 100 \times (101)^2}{1^2 \times 2 + 2^2 \times 3 + \ldots + 100^2 \times 101}$$

is

(A) $\frac{305}{301}$

(B) $\frac{306}{305}$

(C) $\frac{32}{31}$

(D) $\frac{31}{30}$

Step-by-step solution ▸ prepwiser.in/questions/Ib4prUzz4u

Q52 JEE Main 2024 · 30 Jan · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/JuH3x86P4L

Q53 JEE Main 2024 · 27 Jan · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/0ptLfOeAih

Q54 JEE Main 2023 · 13 Apr · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/iiLdEVOfmM

Q55 JEE Main 2023 · 11 Apr · Shift 1

Let

$$S = 109 + \frac{108}{5} + \frac{107}{5^2} + \ldots . + \frac{2}{5^{107}} + \frac{1}{5^{108}}$$

. Then the value of $\left(16S - (25)^{-54}\right)$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/qg_aSuFd7w

Q56 JEE Main 2023 · 11 Apr · Shift 1

If a and b are the roots of the equation $x^2 - 7x - 1 = 0$, then the value of $\frac{a^{21}+b^{21}+a^{17}+b^{17}}{a^{19}+b^{19}}$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/WBWyzUwxiS

Q57 JEE Main 2023 · 11 Apr · Shift 2

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/yGejNrcDY1

Q58 JEE Main 2023 · 10 Apr · Shift 2

If $\mathrm{S}_n = 4 + 11 + 21 + 34 + 50 + \ldots$ to n terms, then $\frac{1}{60}\left(\mathrm{S}_{29} - \mathrm{S}_9\right)$ is equal to :

(A) 227 **(B)** 226

(C) 220 **(D)** 223

Step-by-step solution ▸ prepwiser.in/questions/KBIJI1Ye_y

Q59 JEE Main 2023 · 8 Apr · Shift 2

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

(A) 11280 **(B)** 11290

(C) 11310 **(D)** 11260

Step-by-step solution ▸ prepwiser.in/questions/OK5-Z1THql

Q60 JEE Main 2023 · 8 Apr · Shift 1

Let $S_K = \frac{1+2+\ldots+K}{K}$ and $\sum_{j=1}^{n} S_j^2 = \frac{n}{A}\left(Bn^2 + Cn + D\right)$, where $A, B, C, D \in \mathbb{N}$ and A has least value. Then

(A) $A + B + C + D$ is divisible by 5 **(B)** $A + C + D$ is not divisible by B

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

Step-by-step solution ▸ prepwiser.in/questions/d80SHM4G6f

Q61 JEE Main 2023 · 6 Apr · Shift 1

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

(A) 3420 **(B)** 3450

(C) 3250 **(D)** 3520

Step-by-step solution ▸ prepwiser.in/questions/ZF8yr54EHS

Q62 JEE Main 2023 · 1 Feb · Shift 2

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)** $\frac{13e}{4} + \frac{5}{4e}$

Step-by-step solution ▸ prepwiser.in/questions/qxtKGQmfOt

Q63 JEE Main 2023 · 31 Jan · Shift 2

The sum $1^2 - 2 \cdot 3^2 + 3 \cdot 5^2 - 4 \cdot 7^2 + 5 \cdot 9^2 - \ldots + 15 \cdot 29^2$ is _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/mHugcueaB5

Q64 JEE Main 2023 · 30 Jan · Shift 1

Let

$$\sum_{n=0}^{\infty} \frac{n^3((2n)!) + (2n-1)(n!)}{(n!)((2n)!)} = ae + \frac{b}{e} + c$$

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/UTaxBhMdBt

Q65 JEE Main 2023 · 24 Jan · Shift 2

If

$$\frac{1^3 + 2^3 + 3^3 + \ldots \text{up to } n \text{ terms}}{1.3 + 2.5 + 3.7 + \ldots \text{up to } n \text{ terms}} = \frac{9}{5}$$

, then the value of n is

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/REXWT_jJ9M

Q66 JEE Main 2022 · 29 Jul · Shift 2

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

Step-by-step solution ▸ prepwiser.in/questions/yi2V-nqPai

Q67 JEE Main 2022 · 27 Jun · Shift 1

If the sum of the first ten terms of the series

$$\frac{1}{5} + \frac{2}{65} + \frac{3}{325} + \frac{4}{1025} + \frac{5}{2501} + \ldots.$$

is $\frac{m}{n}$, where m and n are co-prime numbers, then m + n is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/G93yMkAuG0

Q68 JEE Main 2022 · 26 Jun · Shift 1

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/si7zlldz_3

Q69 JEE Main 2022 · 26 Jun · Shift 2

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) $-${{11} \over 9}$

(D) $-${{11} \over 3}$

Step-by-step solution ▸ prepwiser.in/questions/I9hXgqPCp3

Q70 JEE Main 2021 · 1 Sep · Shift 2

Let S_n = 1 . (n − 1) + 2 . (n − 2) + 3 . (n − 3) + ... + (n − 1) . 1, n ≥ 4.

The sum

$$\sum_{n=4}^{\infty}\left(\frac{2S_n}{n!}-\frac{1}{(n-2)!}\right)$$

is equal to :

(A) $\frac{e-1}{3}$

(B) $\frac{e-2}{6}$

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

(D) $\frac{e}{6}$

Step-by-step solution ▸ prepwiser.in/questions/IQdwNn8tNa

Q71 JEE Main 2021 · 31 Aug · Shift 2

If

$$S=\frac{7}{5}+\frac{9}{5^2}+\frac{13}{5^3}+\frac{19}{5^4}+....$$

, then 160 S is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/ADQr91BVHj

Q72 JEE Main 2021 · 27 Aug · Shift 2

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

(A) $\frac{1}{2}e^2$

(B) 2e

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

(D) $2e^2$

Step-by-step solution ▸ prepwiser.in/questions/3lNgJBNlA0

Q73 JEE Main 2021 · 27 Aug · Shift 1

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

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

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

(C) $\frac{1-x}{1+x}+\log_e(1-x)$

(D) $\frac{1+x}{1-x}+\log_e(1-x)$

Step-by-step solution ▸ prepwiser.in/questions/RaDtfD8qbH

Q74 JEE Main 2021 · 25 Jul · Shift 1

If the value of

$$\left(1+\frac{2}{3}+\frac{6}{3^2}+\frac{10}{3^3}+....upto\,\infty\right)^{\log_{(0.25)}\left(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+....upto\,\infty\right)}$$

is l, then l^2 is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/eP8YzP8T4d

Q75 JEE Main 2021 · 20 Jul · Shift 2

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 $47\sum_{n=1}^{\infty}\frac{a_n}{2^{3n}}$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/E7RX3DVcy4

Q76 JEE Main 2021 · 18 Mar · Shift 1

If α, β are natural numbers such that

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

(A) 540 **(B)** 550

(C) 530 **(D)** 510

Step-by-step solution ▸ prepwiser.in/questions/otN9jwjot2

Q77 JEE Main 2021 · 16 Mar · Shift 2

$S_n(x) = \log_{a^{1/2}}x + \log_{a^{1/3}}x + \log_{a^{1/6}}x + \log_{a^{1/11}}x + \log_{a^{1/18}}x + \log_{a^{1/27}}x$ + ... 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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/GFmT26K2bl

Q78 JEE Main 2021 · 26 Feb · Shift 2

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) $-\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$

Step-by-step solution ▸ prepwiser.in/questions/P-fK4PvcXe

Q79 JEE Main 2021 · 26 Feb · Shift 2

If 0 < a, b < 1, and $\tan^{-1}a + \tan^{-1}b = \frac{\pi}{4}$, then the value of

$$(a+b) - \left(\frac{a^2+b^2}{2}\right) + \left(\frac{a^3+b^3}{3}\right) - \left(\frac{a^4+b^4}{4}\right) + ...$$

is :

(A) $\log_e 2$

(B) e

(C) $\log_e\left(\frac{e}{2}\right)$

(D) $e^2 = 1$

Step-by-step solution ▸ prepwiser.in/questions/sNh2p3QpQJ

Q80 JEE Main 2020 · 4 Sep · Shift 1

If $1+(1-2^2.1)+(1-4^2.3)+(1-6^2.5)+.....+(1-20^2.19) = \alpha - 220\beta$,
then an ordered pair (α, β) is equal to:

(A) (11, 103)

(B) (10, 103)

(C) (10, 97)

(D) (11, 97)

Step-by-step solution ▸ prepwiser.in/questions/DiHcc6Owb4

Q81 JEE Main 2020 · 3 Sep · Shift 1

The value of $(2.{}^1P_0 - 3.{}^2P_1 + 4.{}^3P_2$ .... up to 51^{th} term)

+ (1! – 2! + 3! – ..... up to 51^{th} term) is equal to :

(A) 1

(B) 1 + (51)!

(C) 1 – 51(51)!

(D) 1 + (52)!

Step-by-step solution ▸ prepwiser.in/questions/AN6_eopTAI

Q82 JEE Main 2020 · 2 Sep · Shift 1

If |x| < 1, |y| < 1 and $x \neq y$, then the sum to infinity of the following series

$(x + y) + (x^2+xy+y^2) + (x^3+x^2y + xy^2+y^3) + ...$

(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) $\frac{x+y+xy}{(1-x)(1-y)}$

Step-by-step solution ▸ prepwiser.in/questions/_LoELuLL9V

Q83 JEE Main 2020 · 2 Sep · Shift 1

Let α and β be the roots of the equation

$5x^2 + 6x - 2 = 0$. If $S_n = \alpha^n + \beta^n$, n = 1, 2, 3...., then :

(A) $5S_6 + 6S_5 = 2S_4$

(B) $5S_6 + 6S_5 + 2S_4 = 0$

(C) $6S_6 + 5S_5 + 2S_4 = 0$

(D) $6S_6 + 5S_5 = 2S_4$

Step-by-step solution ▸ prepwiser.in/questions/7zJHOMY6tE

Q84 JEE Main 2020 · 9 Jan · Shift 1

The product

$$2^{\frac{1}{4}}.4^{\frac{1}{16}}.8^{\frac{1}{48}}.16^{\frac{1}{128}}$$

... to ∞ is equal to :

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

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

(C) 1

(D) 2

Step-by-step solution ▸ prepwiser.in/questions/C5AY91Ycsm

Q85 JEE Main 2020 · 8 Jan · Shift 2

The sum,

$$\sum_{n=1}^{7} \frac{n\,(n+1)\,(2n+1)}{4}$$

is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/p9EgkJJGIm

Q86 JEE Main 2020 · 8 Jan · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/FjX0QoLU1g

Q87 JEE Main 2020 · 7 Jan · Shift 2

Let α and β be the roots of the equation $x^2 - x - 1 = 0$.

If $p_k = (\alpha)^k + (\beta)^k$, $k \geq 1$, then which one of the following statements is not true?

(A) $(p_1 + p_2 + p_3 + p_4 + p_5) = 26$

(B) $p_5 = 11$

(C) $p_3 = p_5 - p_4$

(D) $p_5 = p_2 \cdot p_3$

Step-by-step solution ▸ prepwiser.in/questions/Bndqr3OLs1

Arithmetico-Geometric Progression · 13 PYQs

Q88 JEE Main 2025 · 24 Jan · Shift 2

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

(A) $\frac{1}{7}$ **(B)** 1

(C) $\frac{6}{7}$ **(D)** 6

Step-by-step solution ▸ prepwiser.in/questions/U45GjD0Q4T

Q89 JEE Main 2024 · 6 Apr · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/bLoICDV7mD

Q90 JEE Main 2023 · 13 Apr · Shift 2

Let $f(x) = \sum_{k=1}^{10} kx^k, x \in \mathbb{R}$. If $2f(2) + f'(2) = 119(2)^{\mathrm{n}} + 1$ then n is equal to _____

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/cLtejioGDb

Q91 JEE Main 2023 · 10 Apr · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/bUyGXG3DxC

Q92 JEE Main 2023 · 29 Jan · Shift 2

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 $S = \sum_{n=1}^{10} \frac{b_n}{2^n}$ and $T = \sum_{n=1}^{8} \frac{n}{2^{n-1}}$, then $2^7(2S - T)$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/xFwPqgFk-Q

Q93 JEE Main 2022 · 30 Jun · Shift 1

Let for $f(x) = a_0x^2 + a_1x + a_2$, $f'(0) = 1$ and $f'(1) = 0$. If a_0, a_1, a_2 are in an arithmatico-geometric progression, whose corresponding A.P. has common difference 1 and corresponding G.P. has common ratio 2, then f(4) is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/aZnvSJ_7rt

Q94 JEE Main 2022 · 29 Jun · Shift 2

The sum of the infinite series

$$1+\frac{5}{6}+\frac{12}{6^2}+\frac{22}{6^3}+\frac{35}{6^4}+\frac{51}{6^5}+\frac{70}{6^6}+\ .....$$

is equal to :

(A) $\frac{425}{216}$ **(B)** $\frac{429}{216}$

(C) $\frac{288}{125}$ **(D)** $\frac{280}{125}$

Step-by-step solution ▸ prepwiser.in/questions/EkkpWw-fKO

Q95 JEE Main 2022 · 29 Jun · Shift 1

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)** $\frac{49}{216}$

Step-by-step solution ▸ prepwiser.in/questions/vKDyXEqud1

Q96 JEE Main 2022 · 27 Jun · Shift 2

Let

$$S = 2+\frac{6}{7}+\frac{12}{7^2}+\frac{20}{7^3}+\frac{30}{7^4}+\ .....$$

. Then 4S is equal to

(A) $\left(\frac{7}{3}\right)^2$ **(B)** $\frac{7^3}{3^2}$

(C) $\left(\frac{7}{3}\right)^3$ **(D)** $\frac{7^2}{3^3}$

Step-by-step solution ▸ prepwiser.in/questions/QxSmH-oB3U

Q97 JEE Main 2022 · 25 Jun · Shift 2

The sum 1 + 2 . 3 + 3 . 3^2 + ... + 10 . 3^9 is equal to :

(A) $\frac{2\,.\,3^{12}+10}{4}$ **(B)** $\frac{19\,.\,3^{10}+1}{4}$

(C) $5\,.\,3^{10}-2$ **(D)** $\frac{9\,.\,3^{10}+1}{2}$

Step-by-step solution ▸ prepwiser.in/questions/PhvP0phuJA

Q98 JEE Main 2021 · 31 Aug · Shift 1

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 3 r^2, then r^2 − d is equal to :

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

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

Step-by-step solution ▸ prepwiser.in/questions/jBLhzVFROr

Q99 JEE Main 2021 · 26 Feb · Shift 1

The sum of the infinite series

$$1+\frac{2}{3}+\frac{7}{3^2}+\frac{12}{3^3}+\frac{17}{3^4}+\frac{22}{3^5}+.....$$

is equal to :

(A) $\frac{9}{4}$ **(B)** $\frac{13}{4}$

(C) $\frac{15}{4}$ **(D)** $\frac{11}{4}$

Step-by-step solution ▸ prepwiser.in/questions/SGMQQbujj8

Q100 JEE Main 2020 · 2 Sep · Shift 2

Let S be the sum of the first 9 terms of the series :

$\{x + ka\} + \{x^2 + (k + 2)a\} + \{x^3 + (k + 4)a\}$

$+ \{x^4 + (k + 6)a\} + ...$ 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) -3 **(B)** 1

(C) -5 **(D)** 3

Step-by-step solution ▸ prepwiser.in/questions/XKq31eDvVn

Telescoping Series · 29 PYQs

Q101 JEE Main 2025 · 4 Apr · Shift 2

If the sum of the first 20 terms of the series $\frac{4\cdot1}{4+3\cdot1^2+1^4}+\frac{4\cdot2}{4+3\cdot2^2+2^4}+\frac{4\cdot3}{4+3\cdot3^2+3^4}+\frac{4\cdot4}{4+3\cdot4^2+4^4}+\ldots\cdot$ is $\frac{m}{n}$, where m and n are coprime, then $m+n$ is equal to :

(A) 423 **(B)** 421

(C) 422 **(D)** 420

Step-by-step solution ▸ prepwiser.in/questions/6zbfb1BwDW

Q102 JEE Main 2025 · 2 Apr · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/1OmYY1OM9c

Q103 JEE Main 2025 · 29 Jan · Shift 1

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

(A) 5/3

(B) 2

(C) 4/3

(D) 7/3

Step-by-step solution ▸ prepwiser.in/questions/-ACz78ZEj3

Q104 JEE Main 2025 · 28 Jan · Shift 2

For positive integers n, if $4a_n = \left(n^2 + 5n + 6\right)$ 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

Step-by-step solution ▸ prepwiser.in/questions/-v_WZV4VHl

Q105 JEE Main 2025 · 24 Jan · Shift 1

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 $\sqrt{2026\mathrm{S}_{2025}}$, then the absolute difference betwen 20^{th} and 15^{th} terms of the A.P. is

(A) 20

(B) 45

(C) 90

(D) 25

Step-by-step solution ▸ prepwiser.in/questions/gfPJ8mIpiM

Q106 JEE Main 2025 · 22 Jan · Shift 1

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) $\frac{2}{3}$

(B) $\frac{1}{3}$

(C) 1

(D) 0

Step-by-step solution ▸ prepwiser.in/questions/yHsFvONJpu

Q107 JEE Main 2024 · 9 Apr · Shift 1

If the sum of the series

$$\frac{1}{1\cdot(1+\mathrm{d})} + \frac{1}{(1+\mathrm{d})(1+2\mathrm{d})} + \ldots + \frac{1}{(1+9\mathrm{d})(1+10\mathrm{d})}$$

is equal to 5, then $50\mathrm{d}$ is equal to :

(A) 5

(B) 10

(C) 15

(D) 20

Step-by-step solution ▸ prepwiser.in/questions/0H0YIBU6Y3

Q108 JEE Main 2024 · 9 Apr · Shift 2

If

$$\left(\frac{1}{\alpha+1} + \frac{1}{\alpha+2} + \ldots.. + \frac{1}{\alpha+1012}\right) - \left(\frac{1}{2\cdot1} + \frac{1}{4\cdot3} + \frac{1}{6\cdot5} + \ldots... + \frac{1}{2024\cdot2023}\right) = \frac{1}{2024}$$

, then α is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/fCGxJU5S1F

Q109 JEE Main 2024 · 5 Apr · Shift 1

If

$$\frac{1}{\sqrt{1}+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\ldots+\frac{1}{\sqrt{99}+\sqrt{100}}=m$$

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

(A) $11(x-1)-100y=0$

(B) $11x-100y=0$

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

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

Step-by-step solution ▸ prepwiser.in/questions/EhrDD7Gny0

Q110 JEE Main 2024 · 31 Jan · Shift 1

The sum of the series

$$\frac{1}{1-3\cdot 1^2+1^4}+\frac{2}{1-3\cdot 2^2+2^4}+\frac{3}{1-3\cdot 3^2+3^4}+\ldots$$

up to 10 -terms is

(A) $\frac{45}{109}$

(B) $-\frac{55}{109}$

(C) $\frac{55}{109}$

(D) $-\frac{45}{109}$

Step-by-step solution ▸ prepwiser.in/questions/WMcyDUrdpY

Q111 JEE Main 2023 · 12 Apr · Shift 1

Let $<a_{\mathrm{n}}>$ be a sequence such that $a_1+a_2+\ldots+a_n=\frac{n^2+3n}{(n+1)(n+2)}$. If $28\sum_{k=1}^{10}\frac{1}{a_k}=p_1p_2p_3\ldots p_m$, where $\mathrm{p}_1,\mathrm{p}_2,\ldots,\mathrm{p}_{\mathrm{m}}$ are the first m prime numbers, then m is equal to

(A) 5

(B) 7

(C) 6

(D) 8

Step-by-step solution ▸ prepwiser.in/questions/nCF6Rq6hnk

Q112 JEE Main 2023 · 6 Apr · Shift 2

If $\gcd(\mathrm{m},\mathrm{n})=1$ 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) 220

(B) 200

(C) 240

(D) 180

Step-by-step solution ▸ prepwiser.in/questions/2TiGSN3qQJ

Q113 JEE Main 2023 · 1 Feb · Shift 1

The sum of 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) $\frac{58}{111}$ **(B)** $\frac{56}{111}$

(C) $\frac{55}{111}$ **(D)** $\frac{59}{111}$

Step-by-step solution ▸ prepwiser.in/questions/jjObkYERNX

Q114 JEE Main 2023 · 30 Jan · Shift 1

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)** $\frac{52}{147}$

Step-by-step solution ▸ prepwiser.in/questions/6d7Zw3jx0k

Q115 JEE Main 2022 · 29 Jul · Shift 1

If

$$\frac{1}{2\times3\times4}+\frac{1}{3\times4\times5}+\frac{1}{4\times5\times6}+\ldots+\frac{1}{100\times101\times102}=\frac{\mathrm{k}}{101}$$

, then 34 k is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/myImL5Rfc5

Q116 JEE Main 2022 · 29 Jul · Shift 2

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

(A) $22!-21!$ **(B)** $22!-2(21!)$

(C) $21!-2(20!)$ **(D)** $21!-20\,!$

Step-by-step solution ▸ prepwiser.in/questions/8jFYjiujiQ

Q117 JEE Main 2022 · 29 Jul · Shift 1

If

$$\frac{1}{(20-a)(40-a)}+\frac{1}{(40-a)(60-a)}+\ldots+\frac{1}{(180-a)(200-a)}=\frac{1}{256}$$

, then the maximum value of a is :

(A) 198 **(B)** 202

(C) 212 **(D)** 218

Step-by-step solution ▸ prepwiser.in/questions/oFNxfKdxRl

Q118 JEE Main 2022 · 28 Jul · Shift 1

Consider the sequence $a_1, a_2, a_3, \ldots$ 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

$$\left(\frac{a_1 + \frac{1}{a_2}}{a_3}\right) \cdot \left(\frac{a_2 + \frac{1}{a_3}}{a_4}\right) \cdot \left(\frac{a_3 + \frac{1}{a_4}}{a_5}\right) \cdots \left(\frac{a_{30} + \frac{1}{a_{31}}}{a_{32}}\right) = 2^{\alpha}\left({}^{61}C_{31}\right)$$

, then α is equal to :

(A) -30 **(B)** -31

(C) -60 **(D)** -61

Step-by-step solution ▸ prepwiser.in/questions/tnFoNLPxjV

Q119 JEE Main 2022 · 27 Jul · Shift 2

$$\frac{2^3 - 1^3}{1 \times 7} + \frac{4^3 - 3^3 + 2^3 - 1^3}{2 \times 11} + \frac{6^3 - 5^3 + 4^3 - 3^3 + 2^3 - 1^3}{3 \times 15} + \cdots + \frac{30^3 - 29^3 + 28^3 - 27^3 + \ldots + 2^3 - 1^3}{15 \times 63}$$

is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/-pdD4KCsMh

Q120 JEE Main 2022 · 26 Jul · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/md7sKrZG7_

Q121 JEE Main 2022 · 25 Jul · Shift 2

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)** $\frac{21}{29}$

Step-by-step solution ▸ prepwiser.in/questions/KcELEoa8mI

Q122 JEE Main 2022 · 30 Jun · Shift 1

The value of

$$1 + \frac{1}{1+2} + \frac{1}{1+2+3} + \ldots. + \frac{1}{1+2+3+\ldots.+11}$$

is equal to:

(A) $\frac{20}{11}$ **(B)** $\frac{11}{6}$

(C) $\frac{241}{132}$ **(D)** $\frac{21}{11}$

Step-by-step solution ▸ prepwiser.in/questions/LK8F8C8Zk5

Q123 JEE Main 2022 · 25 Jun · Shift 1

If

$$\frac{1}{2\,.\,3^{10}}+\frac{1}{2^2\,.\,3^9}+\;.....\;+\;\frac{1}{2^{10}\,.\,3}=\frac{K}{2^{10}\,.\,3^{10}}$$

, then the remainder when K is divided by 6 is :

(A) 1

(B) 2

(C) 3

(D) 5

Step-by-step solution ▸ prepwiser.in/questions/rD-JoUQG61

Q124 JEE Main 2021 · 31 Aug · Shift 1

The sum of 10 terms of the series

$$\frac{3}{1^2\times 2^2}+\frac{5}{2^2\times 3^2}+\frac{7}{3^2\times 4^2}+....$$

is :

(A) 1

(B) $\frac{120}{121}$

(C) $\frac{99}{100}$

(D) $\frac{143}{144}$

Step-by-step solution ▸ prepwiser.in/questions/i5ynfhpY12

Q125 JEE Main 2021 · 26 Aug · Shift 1

The sum of the series

$$\frac{1}{x+1}+\frac{2}{x^2+1}+\frac{2^2}{x^4+1}+.....+\frac{2^{100}}{x^{2^{100}}+1}$$

when x = 2 is :

(A) $1+\frac{2^{101}}{4^{101}-1}$

(B) $1+\frac{2^{100}}{4^{101}-1}$

(C) $1-\frac{2^{100}}{4^{100}-1}$

(D) $1-\frac{2^{101}}{2^{400}-1}$

Step-by-step solution ▸ prepwiser.in/questions/m4H-jUwu0b

Q126 JEE Main 2021 · 18 Mar · Shift 2

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/kB3CKMpXo5

Q127 JEE Main 2021 · 18 Mar · Shift 1

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

is equal to

(A) $\frac{101}{404}$

(B) $\frac{25}{101}$

(C) $\frac{101}{408}$

(D) $\frac{99}{400}$

Step-by-step solution ▸ prepwiser.in/questions/Npy0-cGITi

Q128 JEE Main 2021 · 16 Mar · Shift 1

Let

$$S_k=\sum_{r=1}^{k}\tan^{-1}\left(\frac{6^r}{2^{2r+1}+3^{2r+1}}\right)$$

. Then $\lim\limits_{k\to\infty} S_k$ is equal to :

(A) $\cot^{-1}\left(\frac{3}{2}\right)$

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

(C) $\tan^{-1}(3)$

(D) $\tan^{-1}\left(\frac{3}{2}\right)$

Step-by-step solution ▸ prepwiser.in/questions/DmwrSsejeL

Q129 JEE Main 2021 · 24 Feb · Shift 1

$$\lim_{n\to\infty}\tan\left\{\sum_{r=1}^{n}\tan^{-1}\left(\frac{1}{1+r+r^2}\right)\right\}$$

is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/wfisWueErS

Arithmetic Progression · 70 PYQs

Q130 JEE Main 2025 · 7 Apr · Shift 2

Let a_n be the n^{th} term of an A.P. If $S_n=a_1+a_2+a_3+\ldots+a_n=700$, $a_6=7$ and $S_7=7$, then a_n is equal to :

(A) 65

(B) 56

(C) 70

(D) 64

Step-by-step solution ▸ prepwiser.in/questions/oH9cs-vIG1

Q131 JEE Main 2025 · 4 Apr · Shift 1

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) 3814

(B) 4003

(C) 4027

(D) 3761

Step-by-step solution ▸ prepwiser.in/questions/uF9kXpMCeT

Q132 JEE Main 2025 · 4 Apr · Shift 2

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 $\mathrm{AP's}$ in A and B respectively such that $D = d + 3, d > 0$. If $\frac{p+q}{p-q} = \frac{19}{5}$, then $\mathrm{p} - \mathrm{q}$ is equal to

(A) 540

(B) 450

(C) 600

(D) 630

Step-by-step solution ▸ prepwiser.in/questions/uq4S4kdlia

Q133 JEE Main 2025 · 2 Apr · Shift 1

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) 17

(C) 11

(D) 10

Step-by-step solution ▸ prepwiser.in/questions/7GOKgzXW46

Q134 JEE Main 2025 · 29 Jan · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/uu7mpgb-SW

Q135 JEE Main 2025 · 29 Jan · Shift 1

Consider an A. P. of positive integers, whose sum of the first three terms is 54 and the sum of the first twenty terms lies between 1600 and 1800. Then its 11^{th} term is :

(A) 108

(B) 90

(C) 122

(D) 84

Step-by-step solution ▸ prepwiser.in/questions/nfyEPwhT95

Q136 JEE Main 2025 · 28 Jan · Shift 1

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

(A) 98 **(B)** 126

(C) 112 **(D)** 142

Step-by-step solution ▸ prepwiser.in/questions/F_zPSSfPyq

Q137 JEE Main 2025 · 28 Jan · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/7jKETVGj34

Q138 JEE Main 2025 · 24 Jan · Shift 2

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

(A) 525 **(B)** 505

(C) 510 **(D)** 515

Step-by-step solution ▸ prepwiser.in/questions/wI4PkJgab2

Q139 JEE Main 2025 · 23 Jan · Shift 1

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) -120 **(B)** -1200

(C) -1080 **(D)** -1020

Step-by-step solution ▸ prepwiser.in/questions/NbvnnkIfq4

Q140 JEE Main 2025 · 22 Jan · Shift 2

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) 8 **(B)** 6

(C) 4 **(D)** 5

Step-by-step solution ▸ prepwiser.in/questions/kn7UClzFBj

Q141 JEE Main 2024 · 6 Apr · Shift 2

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) 125 **(B)** 160

(C) 150 **(D)** 180

Step-by-step solution ▸ prepwiser.in/questions/QhHop1rAD-

Q142 JEE Main 2024 · 5 Apr · Shift 1

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 $\mathrm{A}_3 = -153, \mathrm{A}_5 = -435$ and $\mathrm{a}_1^2 + \mathrm{a}_2^2 + \mathrm{a}_3^2 = 66$, then $\mathrm{a}_{17} - \mathrm{A}_7$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/rrR76GDCZ0

Q143 JEE Main 2024 · 5 Apr · Shift 2

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

(A) 10 **(B)** 4

(C) 8 **(D)** 16

Step-by-step solution ▸ prepwiser.in/questions/znkSDKGABW

Q144 JEE Main 2024 · 4 Apr · Shift 1

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

(A) 151 **(B)** 177

(C) 163 **(D)** 169

Step-by-step solution ▸ prepwiser.in/questions/erCpmktrcK

Q145 JEE Main 2024 · 4 Apr · Shift 2

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) 120 **(B)** 316

(C) 312 **(D)** 128

Step-by-step solution ▸ prepwiser.in/questions/Keb24SOazZ

Q146 JEE Main 2024 · 1 Feb · Shift 2

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 $\mathrm{S}_{15} - \mathrm{S}_5$ is equal to :

(A) 800 **(B)** 890

(C) 790 **(D)** 690

Step-by-step solution ▸ prepwiser.in/questions/FmHoknyn9K

Q147 JEE Main 2024 · 1 Feb · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/cdAzRjKSWY

Q148 JEE Main 2024 · 1 Feb · Shift 1

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

Step-by-step solution ▸ prepwiser.in/questions/pEZpJB88H-

Q149 JEE Main 2024 · 31 Jan · Shift 2

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

(A) 990 **(B)** 980

(C) 960 **(D)** 970

Step-by-step solution ▸ prepwiser.in/questions/3tcf7whaQk

Q150 JEE Main 2024 · 30 Jan · Shift 1

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

(A) 405 **(B)** 390

(C) 410 **(D)** 395

Step-by-step solution ▸ prepwiser.in/questions/JKEE5j146_

Q151 JEE Main 2024 · 30 Jan · Shift 2

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/XCmfVT2VnY

Q152 JEE Main 2024 · 29 Jan · Shift 2

If $\log_e \mathrm{a}, \log_e \mathrm{b}, \log_e \mathrm{c}$ are in an A.P. and

$$\log_e \mathrm{a} - \log_e 2\mathrm{b}, \log_e 2\mathrm{b} - \log_e 3\mathrm{c}, \log_e 3\mathrm{c} - \log_e$$

a are also in an A.P, then $a : b : c$ is equal to

(A) $6 : 3 : 2$ **(B)** $9 : 6 : 4$

(C) $25 : 10 : 4$ **(D)** $16 : 4 : 1$

Step-by-step solution ▸ prepwiser.in/questions/MIr0uPm6WU

Q153 JEE Main 2024 · 27 Jan · Shift 2

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

(A) -115 **(B)** -100

(C) -110 **(D)** -118

Step-by-step solution ▸ prepwiser.in/questions/E1NMFyx7zi

Q154 JEE Main 2024 · 27 Jan · Shift 1

The number of common terms in the progressions

$4, 9, 14, 19, \ldots\ldots$, up to 25^{th} term and

$3, 6, 9, 12, \ldots\ldots$, up to 37^{th} term is :

(A) 9 **(B)** 8

(C) 5 **(D)** 7

Step-by-step solution ▸ prepwiser.in/questions/O6ZDP-jLgr

Q155 JEE Main 2023 · 13 Apr · Shift 1

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

(A) 7360 **(B)** 7220

(C) 7260 **(D)** 7380

Step-by-step solution ▸ prepwiser.in/questions/typAoCVMRe

Q156 JEE Main 2023 · 11 Apr · Shift 1

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

(A) 10051.50 **(B)** 10049.50

(C) 10100 **(D)** 10101.50

Step-by-step solution ▸ prepwiser.in/questions/hINOA9Tofx

Q157 JEE Main 2023 · 10 Apr · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/Ns8fSlLcfN

Q158 JEE Main 2023 · 1 Feb · Shift 1

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/oU_b3JCuuQ

Q159 JEE Main 2023 · 1 Feb · Shift 2

The sum of the common terms of the following three arithmetic progressions.

$3, 7, 11, 15, \ldots., 399$,

$2, 5, 8, 11, \ldots., 359$ and

$2, 7, 12, 17, \ldots., 197$,

is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/IRX8pvqKRO

Q160 JEE Main 2023 · 31 Jan · Shift 1

Let $a_1, a_2, \ldots, a_n$ be in A.P. If $a_5 = 2a_7$ and $a_{11} = 18$, then

$$12\left(\frac{1}{\sqrt{a_{10}}+\sqrt{a_{11}}}+\frac{1}{\sqrt{a_{11}}+\sqrt{a_{12}}}+\ldots+\frac{1}{\sqrt{a_{17}}+\sqrt{a_{18}}}\right)$$

is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/RLLqzq0vmG

Q161 JEE Main 2023 · 31 Jan · Shift 2

Let $a_1, a_2, a_3, \ldots$ 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) 24 **(B)** $\frac{381}{4}$

(C) 9 **(D)** $\frac{33}{4}$

Step-by-step solution ▸ prepwiser.in/questions/nAC0AeDc1a

Q162 JEE Main 2023 · 30 Jan · Shift 2

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)** $\frac{125}{8}$

Step-by-step solution ▸ prepwiser.in/questions/rA9TAwEsW8

Q163 JEE Main 2023 · 30 Jan · Shift 2

The 8^{th} common term of the series

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

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

is :

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/FgJ_3asLvE

Q164 JEE Main 2023 · 25 Jan · Shift 1

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 $7^{th}, 9^{th}, 17^{th}$ terms of A_1, A_2, A_3, respective 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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/6T1n4V_ifR

Q165 JEE Main 2023 · 24 Jan · Shift 1

For three positive integers p, q, r, $x^{pq^2} = y^{qr} = z^{p^2r}$ and r = pq + 1 such that 3, 3 $\log_y x$, 3 $\log_z y$, 7 $\log_x z$ are in A.P. with common difference $\frac{1}{2}$. Then r-p-q is equal to

(A) 12 **(B)** -6

(C) 6 **(D)** 2

Step-by-step solution ▸ prepwiser.in/questions/5fHK7gdEsG

Q166 JEE Main 2022 · 29 Jul · Shift 1

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/H7L66Ns48x

Q167 JEE Main 2022 · 27 Jul · Shift 1

Suppose $a_1, a_2, \ldots, a_n$, .. be an arithmetic progression of natural numbers. If the ratio of the sum of 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

Step-by-step solution ▸ prepwiser.in/questions/_6wbGBZ2Rd

Q168 JEE Main 2022 · 27 Jul · Shift 2

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 $10ar^2$, is equal to :

(A) $21\, a_{11}$ **(B)** $22\, a_{11}$

(C) $15\, a_{16}$ **(D)** $14\, a_{16}$

Step-by-step solution ▸ prepwiser.in/questions/JWuvaEwkEK

Q169 JEE Main 2022 · 26 Jul · Shift 2

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/nKzjd8ydPb

Q170 JEE Main 2022 · 25 Jul · Shift 1

Let a, b be two non-zero real numbers. If p and r are the roots of the equation $x^2 - 8ax + 2a = 0$ and q and s are the roots of the equation $x^2 + 12bx + 6b = 0$, such that

$$\frac{1}{p}, \frac{1}{q}, \frac{1}{r}, \frac{1}{s}$$

are in A.P., then $a^{-1} - b^{-1}$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/kDvTMKGgoZ

Q171 JEE Main 2022 · 25 Jul · Shift 1

Let $a_1 = b_1 = 1, a_n = a_{n-1} + 2$ and $b_n = a_n + b_{n-1}$ for every

natural number $n \geqslant 2$. Then $\sum_{n=1}^{15} a_n.b_n$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/WiaCROqaF7

Q172 JEE Main 2022 · 29 Jun · Shift 2

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 _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/fUonC3t4qz

Q173 JEE Main 2022 · 28 Jun · Shift 2

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

Step-by-step solution ▸ prepwiser.in/questions/TYblgDmqFT

Q174 JEE Main 2022 · 27 Jun · Shift 2

If a_1, a_2, a_3 ..... and b_1, b_2, b_3 ..... are A.P., and $a_1 = 2$, $a_{10} = 3$, $a_1b_1 = 1 = a_{10}b_{10}$, then $a_4\, b_4$ is equal to -

(A) $\frac{35}{27}$ **(B)** 1

(C) $\frac{27}{28}$ **(D)** $\frac{28}{27}$

Step-by-step solution ▸ prepwiser.in/questions/tuJBprqMkn

Q175 JEE Main 2022 · 24 Jun · Shift 1

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) 48 **(B)** 96

(C) 92 **(D)** 104

Step-by-step solution ▸ prepwiser.in/questions/nXI1jJfvRw

Q176 JEE Main 2021 · 1 Sep · Shift 2

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

(A) 57 **(B)** 72

(C) 48 **(D)** 36

Step-by-step solution ▸ prepwiser.in/questions/oWjIcZUqAo

Q177 JEE Main 2021 · 31 Aug · Shift 2

Let a_1, a_2, a_3, ... be an A.P. If

$$\frac{a_1 + a_2 + ... + a_{10}}{a_1 + a_2 + ... + a_p} = \frac{100}{p^2}$$

, $p \neq 10$, then $\frac{a_{11}}{a_{10}}$ is equal to :

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

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

Step-by-step solution ▸ prepwiser.in/questions/-RT7QuNf1Y

Q178 JEE Main 2021 · 26 Aug · Shift 2

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/_PCvONNyf3

Q179 JEE Main 2021 · 27 Jul · Shift 1

If $\log_3 2, \log_3(2^x - 5), \log_3\left(2^x - \frac{7}{2}\right)$ are in an arithmetic progression, then the value of x is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/86oTf8Rtcf

Q180 JEE Main 2021 · 25 Jul · Shift 1

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

Step-by-step solution ▸ prepwiser.in/questions/UZYUK83ALS

Q181 JEE Main 2021 · 22 Jul · Shift 2

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

Step-by-step solution ▸ prepwiser.in/questions/bhC3wIgy30

Q182 JEE Main 2021 · 20 Jul · Shift 2

If sum of the first 21 terms of the series $\log_{9^{1/2}} x + \log_{9^{1/3}} x + \log_{9^{1/4}} x + ...$, where x > 0 is 504, then x is equal to

(A) 243 **(B)** 9

(C) 7 **(D)** 81

Step-by-step solution ▸ prepwiser.in/questions/NzB9ENVtuI

Q183 JEE Main 2021 · 18 Mar · Shift 2

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) 7000 **(B)** 1000

(C) 3000 **(D)** 5000

Step-by-step solution ▸ prepwiser.in/questions/oHaWrYaxGf

Q184 JEE Main 2021 · 16 Mar · Shift 1

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 answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/vCcL4rrOhS

Q185 JEE Main 2021 · 26 Feb · Shift 2

Let α and β be two real numbers such that α + β = 1 and α\beta=-1.$Letp < sub > n < /sub >= (\alpha) < sup > n < /sup > +(\beta) < sup > n < /sup >, p < sub > n-1 < /sub >= 11 and p < sub > n + 1 < /sub >= 29 for some integer n\ge1. Then, the value of p_n^2$ is _____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/0EZIti6J_9

Q186 JEE Main 2020 · 6 Sep · Shift 2

The common difference of the A.P.
$b_1, b_2, \ldots, b_m$ is 2 more than the 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) 127 **(B)** 81

(C) –127 **(D)** -81

Step-by-step solution ▸ prepwiser.in/questions/FrKgdOxggJ

Q187 JEE Main 2020 · 5 Sep · Shift 1

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 terms of this A.P. is:

(A) 66 **(B)** 81

(C) 65 **(D)** 78

Step-by-step solution ▸ prepwiser.in/questions/2_boksrzps

Q188 JEE Main 2020 · 5 Sep · Shift 2

If the sum of the first 20 terms of the series

$$\log_{(7^{1/2})} x + \log_{(7^{1/3})} x + \log_{(7^{1/4})} x + \ldots$$

is 460,
then x is equal to :

(A) e^2

(B) $7^{1/2}$

(C) 7^2

(D) $7^{46/21}$

Step-by-step solution ▸ prepwiser.in/questions/XJgJO9vAxN

Q189 JEE Main 2020 · 4 Sep · Shift 2

Let $a_1, a_2, \ldots,$ an 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 (S_{n-4}, a_{n-4}) is equal to:

(A) (2480, 249) **(B)** (2480, 248)

(C) (2490, 248) **(D)** (2490, 249)

Step-by-step solution ▸ prepwiser.in/questions/uqlV4cd3hk

Q190 JEE Main 2020 · 3 Sep · Shift 2

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/GO0PtbUdYf

Q191 JEE Main 2020 · 3 Sep · Shift 2

If the sum of the series

$20 + 19\frac{3}{5} + 19\frac{1}{5} + 18\frac{4}{5} + \ldots$

upto nth term is 488 and the n^{th} term is negative, then :

(A) n = 41

(B) n = 60

(C) n^{th} term is –4

(D) n^{th} term is $-4\frac{2}{5}$

Step-by-step solution ▸ prepwiser.in/questions/wl3-3RvPVb

Q192 JEE Main 2020 · 3 Sep · Shift 1

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) $\frac{1}{4}$

(B) $\frac{1}{5}$

(C) $\frac{1}{7}$

(D) $\frac{1}{6}$

Step-by-step solution ▸ prepwiser.in/questions/Xa0JrSmTow

Q193 JEE Main 2020 · 2 Sep · Shift 2

If the variance of the terms in an increasing A.P.,
b_1 , b_2 , b_3 ,....,b_{11} is 90, then the common difference of this A.P. is_____.

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/zhhRpCy9vu

Q194 JEE Main 2020 · 2 Sep · Shift 2

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

(A) $\frac{121}{10}$

(B) $-\frac{121}{10}$

(C) $\frac{72}{5}$

(D) $-\frac{72}{5}$

Step-by-step solution ▸ prepwiser.in/questions/TtzL0JNP8H

Q195 JEE Main 2020 · 9 Jan · Shift 2

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

Numerical answer — enter the value.

Step-by-step solution ▸ prepwiser.in/questions/RDqfHQZHZx

Q196 JEE Main 2020 · 8 Jan · Shift 1

Let $f : \mathbf{R} \to \mathbf{R}$ 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)** 0

(C) 3 **(D)** 4

Step-by-step solution ▸ prepwiser.in/questions/uTcZ4wG95p

Q197 JEE Main 2020 · 8 Jan · Shift 2

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

(A) 100 **(B)** $100\frac{1}{2}$

(C) $50\frac{1}{4}$ **(D)** 50

Step-by-step solution ▸ prepwiser.in/questions/DKxlhdvtGT

Q198 JEE Main 2020 · 7 Jan · Shift 2

If the sum of the first 40 terms of the series,
3 + 4 + 8 + 9 + 13 + 14 + 18 + 19 + ... is (102)m, then m is equal to :

(A) 20 **(B)** 5

(C) 10 **(D)** 25

Step-by-step solution ▸ prepwiser.in/questions/YD_iyGlhsw

Q199 JEE Main 2020 · 7 Jan · Shift 1

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) $\frac{21}{2}$ **(B)** 27

(C) 7 **(D)** 16

Step-by-step solution ▸ prepwiser.in/questions/w6CQYT7PnH

Answer key — Sequences & Series

Numbers match the question numbers above. For full working, open the solution link under each question.

1	**B**	2	**A**	3	**B**	4	**B**	5	**B**	6	**C**	7	**C**	8	**1**
9	**C**	10	**B**	11	**A**	12	**A**	13	**D**	14	**211**	15	**B**	16	**A**
17	**60**	18	**9**	19	**3**	20	**12**	21	**142**	22	**12**	23	**C**	24	**41651**
25	**C**	26	**C**	27	**40**	28	**98**	29	**4**	30	**D**	31	**B**	32	**14**
33	**10**	34	**D**	35	**C**	36	**3**	37	**D**	38	**4**	39	**D**	40	**A**
41	**C**	42	**30**	43	**B**	44	**D**	45	**B**	46	**A**	47	**B**	48	**C**
49	**A**	50	**76**	51	**A**	52	**353**	53	**9**	54	**1310**	55	**2175**	56	**51**
57	**2**	58	**D**	59	**B**	60	**D**	61	**D**	62	**B**	63	**6952**	64	**26**
65	**5**	66	**B**	67	**276**	68	**1100**	69	**C**	70	**A**	71	**305**	72	**A**
73	**A**	74	**3**	75	**7**	76	**B**	77	**16**	78	**B**	79	**A**	80	**A**
81	**D**	82	**B**	83	**A**	84	**B**	85	**504**	86	**1540**	87	**D**	88	**D**
89	**6**	90	**10**	91	**16**	92	**461**	93	**2**	94	**C**	95	**B**	96	**C**
97	**B**	98	**B**	99	**B**	100	**A**	101	**B**	102	**441**	103	**A**	104	**B**
105	**D**	106	**A**	107	**A**	108	**1011**	109	**B**	110	**B**	111	**C**	112	**C**
113	**C**	114	**C**	115	**286**	116	**B**	117	**C**	118	**C**	119	**120**	120	**166**
121	**B**	122	**B**	123	**D**	124	**B**	125	**D**	126	**160**	127	**B**	128	**A**
129	**1**	130	**D**	131	**D**	132	**A**	133	**C**	134	**11132**	135	**B**	136	**B**
137	**20**	138	**D**	139	**C**	140	**D**	141	**C**	142	**910**	143	**A**	144	**C**
145	**A**	146	**C**	147	**6699**	148	**D**	149	**D**	150	**D**	151	**9**	152	**B**
153	**A**	154	**D**	155	**C**	156	**B**	157	**9525**	158	**754**	159	**321**	160	**8**
161	**A**	162	**B**	163	**151**	164	**495**	165	**D**	166	**16**	167	**B**	168	**A**
169	**53**	170	**38**	171	**27560**	172	**2223**	173	**C**	174	**D**	175	**B**	176	**B**
177	**C**	178	**2021**	179	**3**	180	**A**	181	**A**	182	**D**	183	**C**	184	**3**
185	**324**	186	**D**	187	**A**	188	**C**	189	**C**	190	**39**	191	**C**	192	**D**
193	**3**	194	**D**	195	**14**	196	**C**	197	**B**	198	**A**	199	**D**		