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MATHEMATICS · JEE MAIN

Binomial Theorem

Previous Year Questions with answers

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

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What is in this PDF: every Binomial Theorem 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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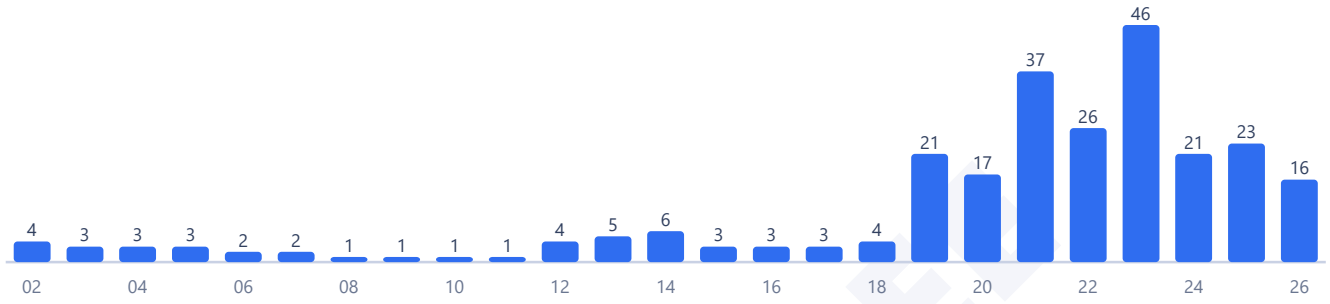
Chapter at a glance

4.5%	256	153 of 162	172 / 84
of Mathematics questions, 2019–2026	questions, 2002–2026	papers asked it, 2019–2026	MCQ / numerical, 2002–2026

Trend. Falling: 1 questions per paper in 2024–2026 against 1.4 in 2019–2023.

Questions per year



Counts are the questions we hold: 256 in 190 papers. No question in this chapter was found repeated across papers.

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

General & Middle Terms	139
Binomial Coefficients	103
Other Expansions	14

How often it comes up

Binomial theorem covers polynomial expansions and coefficient identities under Unit 5: Binomial Theorem and its Simple Applications in the Class 11 curriculum, holding rank 9 of 29 chapters with a 4.5% share of the mathematics section. In the 2019 to 2026 examination timeframe, Binomial Theorem contributed 207 questions across 162 test papers, delivering 4.5% of the mathematics section and holding rank 9 of 29 chapters. During the earlier 2002 to 2018 era, it accounted for 49 questions across 38 papers with a 3.7% share. Across the 2024 to 2026 sessions, it recorded 60 questions across 58 papers, capturing a 3.9% share. Comparing 2002 to 2018 against 2024 to 2026, its share is about the same, while comparing 2019 to 2026 against 2024 to 2026, the trend is down.

The topic has appeared every year from 2019 to 2026. Across 2019 to 2026, it averaged 1.3 questions per paper, settling at 1.0 question per paper in the 2024 to 2026 interval. It serves as an extensive source of numerical problems, generating 84 numerical answer questions between 2019 and 2026.

Most-asked topics

The syllabus organizes across three core topics:

- General & Middle Terms: The largest topic with 139 total questions (107 in 2019 to 2026), evaluated continuously through 2026. Examines writing general terms T_{r+1} = nCr * a^(n-r) * b^r, extracting coefficients of specific powers of x in products of polynomials, locating middle terms, determining rational terms in radical expansions, and identifying terms independent of x.
- Binomial Coefficients: Produced 103 total questions (91 in 2019 to 2026), tested through 2026. Explores coefficient summation identities, calculus methods (differentiating or integrating (1 + x)^n), Pascal's identity (nCr + nC{r-1} = {n+1}Cr), Vandermonde convolution, and divisibility remainders evaluating large powers modulo an integer.

- Other Expansions: Contributed 14 total questions (9 in 2019 to 2026), last tested in 2025. Covers trinomial and multinomial expansions via general term expressions (n! / (p! q! r!)) and expansions for rational exponents.

What the questions look like

Examiners test combinatorial algebra and polynomial coefficient extraction. A very common pattern multiplies a quadratic or linear polynomial by a binomial power, such as (ax^2 + bx + c)(1 - 2x)^26, providing the numeric coefficients of consecutive powers of x to set up simultaneous equations for a, b, and c.

Another recurring question type asks for remainders: candidates express large powers like 25^13 in the form (7k + 4)^13 or expand (1 + x)^n with x chosen strategically to isolate remainders modulo an integer. Coefficient series questions frequently require recognizing derivatives or integrals of (1 + x)^n.

How to practise it

Prepare for binomial theorem by mastering general term indices alongside standard series identities:

1. Formulate general terms cleanly: In (a + b)^n, write T_{r+1} = nCr * a^(n-r) * b^r. Collect all powers of x into a single exponent expression and equate it to the target power (or zero for independent terms) to solve for integer r. 2. Check rational term constraints: In expressions like (a^(1/p) + b^(1/q))^n, rational terms require that n - r is a multiple of p and r is simultaneously a multiple of q for valid integer index r between zero and n. 3. Master standard coefficient identities: The sum of all binomial coefficients equals 2^n; alternating coefficient sums cancel out; the derivative identity gives the sum of r * nCr as n * 2^(n-1). 4. Evaluate remainders via binomial expansion: To find the remainder of a^n divided by m, write a as (qm + r) or (qm - r) and expand, observing that all terms except the final term contain m as a factor. 5. Use multinomial general terms: The coefficient of x1^p * x2^q * x3^r in (x1 + x2 + x3)^n is n! / (p! q! r!) subject to p + q + r = n.

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Q1 JEE Main 2026 · 8 Apr · Shift 2 MCQ

If $26\left(\frac{2^3}{3}\left({}^{12}C_2\right)+\frac{2^5}{5}\left({}^{12}C_4\right)+\frac{2^7}{7}\left({}^{12}C_6\right)+\ldots+\frac{2^{13}}{13}\left({}^{12}C_{12}\right)\right)=3^{13}-\alpha$, then α is equal to :

(A) 45
(B) 48
(C) 51
(D) 54

Answer: (C) 51 · Official NTA final key

Q2 JEE Main 2026 · 6 Apr · Shift 1 MCQ

If the coefficients of the middle terms in the binomial expansions of $(1+\alpha x)^{26}$ and $(1-\alpha x)^{28}$, $\alpha \neq 0$, are equal, then the value of α is:

(A) 1
(B) $\frac{14}{13}$
(C) $\frac{27}{7}$
(D) $\frac{7}{27}$

Answer: (D) $\frac{7}{27}$ · Official NTA final key

Q3 JEE Main 2026 · 6 Apr · Shift 2 Numerical

If $(1-x^3)^{10}=\sum_{r=0}^{10} a_r\, x^r(1-x)^{30-2r}$, then $\frac{9a_9}{a_{10}}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 30. · Official NTA final key

Q4 JEE Main 2026 · 5 Apr · Shift 1 Numerical

If the sum of the coefficients of x^7 and x^{14} in the expansion of $\left(\frac{1}{x^3}-x^4\right)^n$, $x \neq 0$, is zero, then the value of n is _____.

Numerical value type: the answer is a number.

Answer: 21. · Official NTA final key

Q5 JEE Main 2026 · 5 Apr · Shift 2 MCQ

The coefficient of x^2 in the expansion of $\left(2x^2+\frac{1}{x}\right)^{10}$, $x \neq 0$, is :

(A) 3240
(B) 3360
(C) 3480
(D) 3600

Answer: (B) 3360 · Official NTA final key

Q6 JEE Main 2026 · 4 Apr · Shift 1 MCQ

Let the smallest value of $k \in \mathrm{N}$, for which the coefficient of x^3 in $(1+x)^3+(1+x)^4+(1+x)^5+\ldots+(1+x)^{99}+(1+kx)^{100}$, $x \neq 0$, is $\left(43n+\frac{101}{4}\right)\left({}^{100}\mathrm{C}_3\right)$ for some $n \in \mathrm{N}$, be p. Then the value of $p+n$ is:

(A) 10
(B) 11
(C) 12
(D) 13

Answer: (B) 11 · Official NTA final key

Q7 JEE Main 2026 · 4 Apr · Shift 2 MCQ

In the expansion of $\left(9x-\frac{1}{3\sqrt{x}}\right)^{18}$, $x>0$, if the term independent of x is $(221)k$, then k is equal to:

(A) 84
(B) 78
(C) 168
(D) 198

Answer: (A) 84 · Official NTA final key

Q8 JEE Main 2026 · 2 Apr · Shift 2 MCQ

If for $3 \leq \mathrm{r} \leq 30$, $\left({}^{30}\mathrm{C}_{30-\mathrm{r}}\right)+3\left({}^{30}\mathrm{C}_{31-\mathrm{r}}\right)+3\left({}^{30}\mathrm{C}_{32-\mathrm{r}}\right)+\left({}^{30}\mathrm{C}_{33-\mathrm{r}}\right)={}^{\mathrm{m}}\mathrm{C}_{\mathrm{r}}$, then m equals :

(A) 31
(B) 32
(C) 33
(D) 34

Answer: (C) 33 · Official NTA final key

Q9 JEE Main 2026 · 28 Jan · Shift 2 MCQ

Given below are two statements :

Statement I : $25^{13}+20^{13}+8^{13}+3^{13}$ is divisible by 7.

Statement II : The integral part of $\left(7+4\sqrt{3}\right)^{25}$ is an odd number.

In the light of the above statements, choose the **correct answer** from the options given below :

(A) **Statement I** is false but **Statement II** is true

(B) **Statement I** is true but **Statement II** is false

(C) Both **Statement I** and **Statement II** are false

(D) Both **Statement I** and **Statement II** are true

Answer: (D) Both **Statement I** and **Statement II** are true · Official NTA final key

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Q10 JEE Main 2026 · 28 Jan · Shift 2 MCQ

The sum of the coefficients of x^{499} and x^{500} in $(1+x)^{1000}+x(1+x)^{999}+x^2(1+x)^{998}+\ldots+x^{1000}$ is :

(A) ${}^{1000}\mathrm{C}_{501}$

(B) ${}^{1002}\mathrm{C}_{500}$

(C) ${}^{1001}\mathrm{C}_{501}$

(D) ${}^{1002}\mathrm{C}_{501}$

Answer: (B) ${}^{1002}\mathrm{C}_{500}$ · Official NTA final key

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Q11 JEE Main 2026 · 24 Jan · Shift 1 MCQ

Let $\mathrm{S}=\frac{1}{25!}+\frac{1}{3!\,23!}+\frac{1}{5!\,21!}+\ldots$ up to 13 terms. If $13\mathrm{S}=\frac{2^k}{n!}$, $k\in\mathbb{N}$, then $n+k$ is equal to

(A) 52

(B) 51

(C) 49

(D) 50

Answer: (C) 49 · Official NTA final key

Q12 JEE Main 2026 · 23 Jan · Shift 1 MCQ

The sum of all possible values of $n\in\mathbf{N}$, so that the coefficients of x, x^2 and x^3 in the expansion of $(1+x^2)^2(1+x)^n$, are in arithmetic progression is :

(A) 9

(B) 3

(C) 7

(D) 12

Answer: (A) 9 · Official NTA final key

Q13 JEE Main 2026 · 23 Jan · Shift 1 MCQ

The value of $\frac{{}^{100}C_{50}}{51}+\frac{{}^{100}C_{51}}{52}+\ldots\ldots+\frac{{}^{100}C_{100}}{101}$ is :

(A) $\frac{2^{100}}{100}$
(B) $\frac{2^{101}}{100}$
(C) $\frac{2^{101}}{101}$
(D) $\frac{2^{100}}{101}$

Answer: (D) $\frac{2^{100}}{101}$ · Official NTA final key

Q14 JEE Main 2026 · 22 Jan · Shift 1 MCQ

The coefficient of x^{48} in $(1+x)+2(1+x)^2+3(1+x)^3+\ldots+100(1+x)^{100}$ is equal to

(A) $100\cdot{}^{101}C_{49}-{}^{101}C_{50}$
(B) $100\cdot{}^{100}C_{49}-{}^{100}C_{48}$
(C) $100\cdot{}^{100}C_{49}-{}^{100}C_{50}$
(D) ${}^{100}C_{50}+{}^{101}C_{49}$

Answer: (A) $100\cdot{}^{101}C_{49}-{}^{101}C_{50}$ · Official NTA final key

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Q15 JEE Main 2026 · 22 Jan · Shift 2 MCQ

Let C_r denote the coefficient of x^r in the binomial expansion of $(1+x)^n$, $n\in\mathbf{N}$, $0\le r\le n$. If $P_n=C_0-C_1+\frac{2^2}{3}C_2-\frac{2^3}{4}C_3+\ldots\ldots+\frac{(-2)^n}{n+1}C_n$, then the value of $\sum_{n=1}^{25}\frac{1}{P_{2n}}$ equals.

(A) 650
(B) 525
(C) 675
(D) 580

Answer: (C) 675 · Official NTA final key

Q16 JEE Main 2026 · 21 Jan · Shift 1 MCQ

If the coefficient of x in the expansion of $(ax^2+bx+c)(1-2x)^{26}$ is -56 and the coefficients of x^2 and x^3 are both zero, then $a+b+c$ is equal to :

(A) 1300
(B) 1500
(C) 1403
(D) 1483

Answer: (C) 1403 · Official NTA final key

Q17 JEE Main 2025 · 8 Apr · Shift 2 MCQ

The number of integral terms in the expansion of $\left(5^{\frac{1}{2}}+7^{\frac{1}{8}}\right)^{1016}$ is

(A) 129
(B) 128
(C) 130
(D) 127

Answer: (B) 128 · Key from source paper

Q18 JEE Main 2025 · 8 Apr · Shift 2 · Numerical

The product of the last two digits of $(1919)^{1919}$ is _____

Numerical value type: the answer is a number.

Answer: 63. · Key from source paper

Q19 JEE Main 2025 · 7 Apr · Shift 1 · MCQ

The remainder when $\left((64)^{(64)}\right)^{(64)}$ is divided by 7 is equal to

(A) 4
(B) 6
(C) 3
(D) 1

Answer: (D) 1 · Key from source paper

Q20 JEE Main 2025 · 7 Apr · Shift 2 · Numerical

The sum of the series

$2 \times 1 \times {}^{20}C_4 - 3 \times 2 \times {}^{20}C_5 + 4 \times 3 \times {}^{20}C_6 - 5 \times 4 \times {}^{20}C_7 + \ldots\ldots + 18 \times 17 \times {}^{20}C_{20}$, is equal to _____ .

Numerical value type: the answer is a number.

Answer: 34. · Key from source paper

Q21 JEE Main 2025 · 4 Apr · Shift 1 · MCQ

For an integer $n \geq 2$, if the arithmetic mean of all coefficients in the binomial expansion of $(x+y)^{2n-3}$ is 16 , then the distance of the point $P\left(2n-1, n^2-4n\right)$ from the line $x+y=8$ is

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

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

Q22 JEE Main 2025 · 4 Apr · Shift 1 MCQ

In the expansion of $\left(\sqrt[3]{2}+\frac{1}{\sqrt[3]{3}}\right)^{n}, n \in \mathbb{N}$, if the ratio of 15th term from the beginning to the 15th term from the end is $\frac{1}{6}$, then the value of ${}^{n}C_{3}$ is

(A) 2300
(B) 1040
(C) 4060
(D) 4960

Answer: (A) 2300 · Key from source paper

Q23 JEE Main 2025 · 4 Apr · Shift 2 MCQ

If $1^2 \cdot \left({}^{15}C_1\right) + 2^2 \cdot \left({}^{15}C_2\right) + 3^2 \cdot \left({}^{15}C_3\right) + \ldots + 15^2 \cdot \left({}^{15}C_{15}\right) = 2^m \cdot 3^n \cdot 5^k$, where $m, n, k \in N$, then $m+n+k$ is equal to :

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

Answer: (D) 19 · Key from source paper

Q24 JEE Main 2025 · 3 Apr · Shift 1 MCQ

If $\sum_{r=1}^{9}\left(\frac{r+3}{2^r}\right) \cdot {}^{9}C_r = \alpha\left(\frac{3}{2}\right)^9 - \beta, \beta, \alpha \in \square$, then $(\alpha+\beta)^2$ is equal to

(A) 9
(B) 81
(C) 18
(D) 27

Answer: (B) 81 · Key from source paper

Q25 JEE Main 2025 · 3 Apr · Shift 1 MCQ

The sum of all rational terms in the expansion of $(2+\sqrt{3})^8$ is

(A) 16923
(B) 33845
(C) 3763
(D) 18817

Answer: (D) 18817 · Key from source paper

Q26 JEE Main 2025 · 3 Apr · Shift 2 Numerical

Let $\left(1+x+x^2\right)^{10}=a_0+a_1x+a_2x^2+\ldots+a_{20}x^{20}$. If $\left(a_1+a_3+a_5+\ldots+a_{19}\right)-11a_2=121k$, then k is equal to _____.

Numerical value type: the answer is a number.

Answer: 239. · Key from source paper

Q27 JEE Main 2025 · 2 Apr · Shift 1 MCQ

The term independent of x in the expansion of $\left(\frac{(x+1)}{\left(x^{2/3}+1-x^{1/3}\right)}-\frac{(x-1)}{\left(x-x^{1/2}\right)}\right)^{10}$, $x>1$, is :

(A) 120
(B) 240
(C) 210
(D) 150

Answer: (C) 210 · Key from source paper

Q28 JEE Main 2025 · 2 Apr · Shift 2 MCQ

If $\sum_{r=0}^{10}\left(\frac{10^{r+1}-1}{10^r}\right)\cdot{}^{11}C_{r+1}=\frac{\alpha^{11}-11^{11}}{10^{10}}$, then α is equal to :

(A) 24
(B) 20
(C) 15
(D) 11

Answer: (B) 20 · Key from source paper

Q29 JEE Main 2025 · 29 Jan · Shift 1 MCQ

The least value of n for which the number of integral terms in the Binomial expansion of $\left(\sqrt[3]{7}+\sqrt[12]{11}\right)^n$ is 183, is :

(A) 2184
(B) 2196
(C) 2148
(D) 2172

Answer: (A) 2184 · Key from source paper

Q30 JEE Main 2025 · 29 Jan · Shift 2 MCQ

The remainder, when 7^{103} is divided by 23 , is equal to :

(A) 6
(B) 17
(C) 9
(D) 14

Answer: (D) 14 · Key from source paper

Q31 JEE Main 2025 · 28 Jan · Shift 1 Numerical

If $\alpha = 1 + \sum_{r=1}^{6} (-3)^{r-1}\, {}^{12}C_{2r-1}$, then the distance of the point $(12, \sqrt{3})$ from the line $\alpha x - \sqrt{3}y + 1 = 0$ is _____ .

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q32 JEE Main 2025 · 28 Jan · Shift 2 MCQ

Let the coefficients of three consecutive terms T_r, T_{r+1} and T_{r+2} in the binomial expansion of $(a + b)^{12}$ be in a G.P. and let p be the number of all possible values of r. Let q be the sum of all rational terms in the binomial expansion of $(\sqrt[4]{3} + \sqrt[3]{4})^{12}$. Then p + q is equal to :

(A) 283
(B) 287
(C) 295
(D) 299

Answer: (A) 283 · Key from source paper

Q33 JEE Main 2025 · 24 Jan · Shift 1 MCQ

For some $n \neq 10$, let the coefficients of the 5 th, 6 th and 7 th terms in the binomial expansion of $(1 + x)^{n+4}$ be in A.P. Then the largest coefficient in the expansion of $(1 + x)^{n+4}$ is:

(A) 20
(B) 10
(C) 35
(D) 70

Answer: (C) 35 · Key from source paper

Q34 JEE Main 2025 · 24 Jan · Shift 2 MCQ

Suppose A and B are the coefficients of 30th and 12th terms respectively in the binomial expansion of $(1 + x)^{2n-1}$. If $2A = 5B$, then n is equal to :

(A) 22
(B) 20
(C) 21
(D) 19

Answer: (C) 21 · Key from source paper

Q35 JEE Main 2025 · 23 Jan · Shift 1 · Numerical

The sum of all rational terms in the expansion of $\left(1+2^{1/3}+3^{1/2}\right)^{6}$ is equal to _____

Numerical value type: the answer is a number.

Answer: 612. · Key from source paper

Q36 JEE Main 2025 · 23 Jan · Shift 2 · MCQ

If in the expansion of $(1+x)^{p}(1-x)^{q}$, the coefficients of x and x^2 are 1 and -2 , respectively, then p^2+q^2 is equal to :

(A) 18
(B) 13
(C) 8
(D) 20

Answer: (B) 13 · Key from source paper

Q37 JEE Main 2025 · 22 Jan · Shift 1 · Numerical

If $\sum_{r=0}^{5} \frac{{}^{11}C_{2r+1}}{2r+2}=\frac{m}{n}$, $\gcd(m,n)=1$, then $m-n$ is equal to _____

Numerical value type: the answer is a number.

Answer: 2035. · Key from source paper

Q38 JEE Main 2025 · 22 Jan · Shift 2 · MCQ

Let α, β, γ and δ be the coefficients of x^7, x^5, x^3 and x respectively in the expansion of $\left(x+\sqrt{x^3-1}\right)^5+\left(x-\sqrt{x^3-1}\right)^5$, $x>1$. If u and v satisfy the equations $\begin{cases}\alpha u+\beta v=18\\ \gamma u+\delta v=20\end{cases}$ then $u+v$ equals :

(A) 5
(B) 3
(C) 4
(D) 8

Answer: (A) 5 · Key from source paper

Q39 JEE Main 2025 · 22 Jan · Shift 2 Numerical

If $\sum_{r=1}^{30} \frac{r^2\left({}^{30}C_r\right)^2}{{}^{30}C_{r-1}} = \alpha \times 2^{29}$, then α is equal to _____

Numerical value type: the answer is a number.

Answer: 465. · Key from source paper

Q40 JEE Main 2024 · 9 Apr · Shift 1 MCQ

The coefficient of x^{70} in $x^2(1+x)^{98} + x^3(1+x)^{97} + x^4(1+x)^{96} + \ldots + x^{54}(1+x)^{46}$ is ${}^{99}\mathrm{C}_\mathrm{p} - {}^{46}\mathrm{C}_\mathrm{q}$. Then a possible value of $p+q$ is :

(A) 55
(B) 83
(C) 61
(D) 68

Answer: (B) 83 · Key from source paper

Q41 JEE Main 2024 · 9 Apr · Shift 1 Numerical

The remainder when 428^{2024} is divided by 21 is _____

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q42 JEE Main 2024 · 9 Apr · Shift 2 MCQ

The sum of the coefficient of $x^{2/3}$ and $x^{-2/5}$ in the binomial expansion of $\left(x^{2/3} + \frac{1}{2}x^{-2/5}\right)^9$ is

(A) 21/4
(B) 63/16
(C) 19/4
(D) 69/16

Answer: (A) 21/4 · Key from source paper

Q43 JEE Main 2024 · 8 Apr · Shift 1 Numerical

Let $\alpha = \sum_{r=0}^{n}(4r^2+2r+1)\,{}^nC_r$ and $\beta = \left(\sum_{r=0}^{n} \frac{{}^nC_r}{r+1}\right) + \frac{1}{n+1}$. If $140 < \frac{2\alpha}{\beta} < 281$, then the value of n is _____

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q44 JEE Main 2024 · 8 Apr · Shift 2 MCQ

If the term independent of x in the expansion of $\left(\sqrt{\mathrm{a}}\,x^2 + \frac{1}{2x^3}\right)^{10}$ is 105 , then a^2 is equal to :

(A) 2
(B) 4
(C) 6
(D) 9

Answer: (B) 4 · Key from source paper

Q45 JEE Main 2024 · 6 Apr · Shift 1 · Numerical

If the second, third and fourth terms in the expansion of $(x+y)^n$ are 135,30 and $\frac{10}{3}$, respectively, then $6\left(n^3+x^2+y\right)$ is equal to _____

Numerical value type: the answer is a number.

Answer: 806. · Key from source paper

Q46 JEE Main 2024 · 5 Apr · Shift 1 · Numerical

If the constant term in the expansion of $\left(1+2x-3x^3\right)\left(\frac{3}{2}x^2-\frac{1}{3x}\right)^9$ is p, then 108p is equal to

Numerical value type: the answer is a number.

Answer: 54. · Key from source paper

Q47 JEE Main 2024 · 5 Apr · Shift 2 · MCQ

If the constant term in the expansion of $\left(\frac{\sqrt[5]{3}}{x}+\frac{2x}{\sqrt[3]{5}}\right)^{12}$, $x\neq 0$, is $\alpha\times 2^8\times\sqrt[5]{3}$, then 25α is equal to :

(A) 724
(B) 742
(C) 639
(D) 693

Answer: (D) 693 · Key from source paper

Q48 JEE Main 2024 · 4 Apr · Shift 1 · MCQ

The sum of all rational terms in the expansion of $\left(2^{\frac{1}{5}}+5^{\frac{1}{3}}\right)^{15}$ is equal to :

(A) 3133
(B) 931
(C) 6131
(D) 633

Answer: (A) 3133 · Key from source paper

Q49 JEE Main 2024 · 4 Apr · Shift 2 · MCQ

If the coefficients of x^4, x^5 and x^6 in the expansion of $(1+x)^n$ are in the arithmetic progression, then the maximum value of n is:

(A) 7
(B) 21
(C) 28
(D) 14

Answer: (D) 14 · Key from source paper

Q50 JEE Main 2024 · 1 Feb · Shift 1 · Numerical

If the coefficient of x^{30} in the expansion of $\left(1+\frac{1}{x}\right)^6\left(1+x^2\right)^7\left(1-x^3\right)^8$; $x \neq 0$ is α, then $|\alpha|$ equals _____ .

Numerical value type: the answer is a number.

Answer: 678. · Key from source paper

Q51 JEE Main 2024 · 1 Feb · Shift 2 · MCQ

Let m and n be the coefficients of seventh and thirteenth terms respectively in the expansion of $\left(\frac{1}{3}x^{\frac{1}{3}}+\frac{1}{2x^{\frac{2}{3}}}\right)^{18}$. Then $\left(\frac{n}{m}\right)^{\frac{1}{3}}$ is:

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

Answer: (D) $\frac{9}{4}$ · Key from source paper

Q52 JEE Main 2024 · 31 Jan · Shift 1 · Numerical

In the expansion of $1+x\,1-x^2\,1+\frac{3}{x}+\frac{3}{x^2}+\frac{1}{x^3}^5$, $x \neq 0$, the sum of the coefficient of x^3 and x^{-13} is equal to _____.

Numerical value type: the answer is a number.

Answer: 118. · Key from source paper

Q53 JEE Main 2024 · 31 Jan · Shift 2 · Numerical

Let the coefficient of x^r in the expansion of $x+3^{n-1}+x+3^{n-2}x+2+x+3^{n-3}x+2^2+\ldots+x+2^{n-1}$ be α_r. If $\sum_{r=0}^{n}\alpha_r=\beta^n-\gamma^n$, $\beta,\gamma\in N$, then the value of $\beta^2+\gamma^2$ equals _____.

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q54 JEE Main 2024 · 30 Jan · Shift 1 · Numerical

Number of integral terms in the expansion of $\left\{7^{\left(\frac{1}{2}\right)}+11^{\left(\frac{1}{6}\right)}\right\}^{824}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 138. · Key from source paper

Q55 JEE Main 2024 · 30 Jan · Shift 2 MCQ

Suppose $28-p$, p, $70-\alpha$, α are the coefficient of four consecutive terms in the expansion of $(1+x)^n$. Then the value of $2\alpha-3p$ equals

(A) 7
(B) 10
(C) 4
(D) 6

Answer: (A) 7 · Key from source paper

Q56 JEE Main 2024 · 30 Jan · Shift 2 Numerical

Let $\alpha=\sum_{k=0}^{n}\frac{{}^{n}C_k^2}{k+1}$ and $\beta=\sum_{k=0}^{n-1}\frac{{}^{n}C_k\,{}^{n}C_{k+1}}{k+2}$. If $5\alpha=6\beta$, then n equals

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q57 JEE Main 2024 · 29 Jan · Shift 1 Numerical

If $\frac{{}^{11}C_1}{2}+\frac{{}^{11}C_2}{3}+\ldots\ldots+\frac{{}^{11}C_9}{10}=\frac{n}{m}$ with gcd $(n,m)=1$, then $n+m$ is equal to

Numerical value type: the answer is a number.

Answer: 2041. · Key from source paper

Q58 JEE Main 2024 · 29 Jan · Shift 2 Numerical

Remainder when $64^{32^{32}}$ is divided by 9 is equal to _____.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q59 JEE Main 2024 · 27 Jan · Shift 1 MCQ

If A denotes the sum of all the coefficients in the expansion of $(1-3x+10x^2)^n$ and B denotes the sum of all the coefficients in the expansion of $(1+x^2)^n$, then :

(A) A = B^3
(B) 3 A = B
(C) B = A^3
(D) A = 3 B

Answer: (A) A = B^3 · Key from source paper

Q60 JEE Main 2024 · 27 Jan · Shift 2 · Numerical

The coefficient of x^{2012} in the expansion of $1-x^{2008}1+x+x^{2\,2007}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 0. · Key from source paper

Q61 JEE Main 2023 · 15 Apr · Shift 1 · MCQ

Let $(a+bx+cx^2)^{10}=\sum_{i=10}^{20}p_ix^i$, $a, b, c \in \mathbb{N}$. If $p_1=20$ and $p_2=210$, then $2(a+b+c)$ is equal to

(A) 6
(B) 15
(C) 12
(D) 8

Answer: (C) 12 · Key from source paper

Q62 JEE Main 2023 · 15 Apr · Shift 1 · Numerical

The number of elements in the set $\{n \in \mathbb{N} : 10 \le n \le 100 \text{ and } 3^n-3 \text{ is a multiple of } 7\}$ is _____.

Numerical value type: the answer is a number.

Answer: 15. · Key from source paper

Q63 JEE Main 2023 · 13 Apr · Shift 1 · MCQ

Fractional part of the number $\frac{4^{2022}}{15}$ is equal to

(A) $\frac{8}{15}$
(B) $\frac{4}{15}$
(C) $\frac{14}{15}$
(D) $\frac{1}{15}$

Answer: (D) $\frac{1}{15}$ · Key from source paper

Q64 JEE Main 2023 · 13 Apr · Shift 1 · Numerical

Let α be the constant term in the binomial expansion of $\left(\sqrt{x}-\frac{6}{x^{\frac{3}{2}}}\right)^n$, $n \le 15$. If the sum of the coefficients of the remaining terms in the expansion is 649 and the coefficient of x^{-n} is $\lambda\alpha$, then λ is equal to _____.

Numerical value type: the answer is a number.

Answer: 36. · Key from source paper

Q65 JEE Main 2023 · 13 Apr · Shift 2 · MCQ

The coefficient of x^5 in the expansion of $\left(2x^3-\frac{1}{3x^2}\right)^5$ is

(A) $\frac{80}{9}$
(B) 9
(C) 8
(D) $\frac{26}{3}$

Answer: (A) $\frac{80}{9}$ · Key from source paper

Q66 JEE Main 2023 · 13 Apr · Shift 2 Numerical

The remainder, when 7^{103} is divided by 17, is

Numerical value type: the answer is a number.

Answer: 12. · Key from source paper

Q67 JEE Main 2023 · 12 Apr · Shift 1 MCQ

If $\frac{1}{n+1}{}^nC_n + \frac{1}{n}{}^nC_{n-1} + \ldots + \frac{1}{2}{}^nC_1 + {}^nC_0 = \frac{1023}{10}$ then n is equal to

(A) 9
(B) 8
(C) 7
(D) 6

Answer: (A) 9 · Key from source paper

Q68 JEE Main 2023 · 12 Apr · Shift 1 MCQ

The sum, of the coefficients of the first 50 terms in the binomial expansion of $(1-x)^{100}$, is equal to

(A) ${}^{101}C_{50}$
(B) ${}^{99}C_{49}$
(C) $-{}^{101}C_{50}$
(D) $-{}^{99}C_{49}$

Answer: (D) $-{}^{99}C_{49}$ · Key from source paper

Q69 JEE Main 2023 · 11 Apr · Shift 1 Numerical

The number of integral terms in the expansion of $\left(3^{\frac{1}{2}} + 5^{\frac{1}{4}}\right)^{680}$ is equal to

Numerical value type: the answer is a number.

Answer: 171. · Key from source paper

Q70 JEE Main 2023 · 11 Apr · Shift 1 Numerical

The mean of the coefficients of $x, x^2, \ldots, x^7$ in the binomial expression of $(2+x)^9$ is _____

EdLoop JEE

Numerical value type: the answer is a number.

Answer: 2736. · Key from source paper

Q71 JEE Main 2023 · 11 Apr · Shift 2 MCQ

If the 1011th term from the end in the binomial expansion of $\left(\frac{4x}{5}-\frac{5}{2x}\right)^{2022}$ is 1024 times 1011th term from the beginning, then $32|x|$ is equal to

(A) 15
(B) 10
(C) 12
(D) 8

Answer: (B) 10 · Key from source paper

Q72 JEE Main 2023 · 11 Apr · Shift 2 MCQ

The sum of the coefficients of three consecutive terms in the binomial expansion of $(1+x)^{n+2}$, which are in the ratio $1:3:5$, is equal to

(A) 92
(B) 63
(C) 41
(D) 25

Answer: (B) 63 · Key from source paper

Q73 JEE Main 2023 · 10 Apr · Shift 1 MCQ

If the coefficient of x^7 in $\left(ax-\frac{1}{bx^2}\right)^{13}$ and the coefficient of x^{-5} in $\left(ax+\frac{1}{bx^2}\right)^{13}$ are equal, then a^4b^4 is equal to:

(A) 11
(B) 44
(C) 22
(D) 33.

Answer: (C) 22 · Key from source paper

Q74 JEE Main 2023 · 10 Apr · Shift 1 Numerical

The coefficient of x^7 in $1-x+2x^{310}$ is _____.

Numerical value type: the answer is a number.

Answer: 960. · Key from source paper

EdLoop JEE

Q75 JEE Main 2023 · 10 Apr · Shift 2 MCQ

Let the number $(22)^{2022} + (2022)^{22}$ leave the remainder α when divided by 3 and β when divided by 7. Then $(\alpha^2 + \beta^2)$ is equal to

(A) 20
(B) 13
(C) 5
(D) 10

Answer: (C) 5 · Key from source paper

Q76 JEE Main 2023 · 10 Apr · Shift 2 MCQ

If the coefficients of x and x^2 in $(1+x)^p(1-x)^q$ are 4 and -5 respectively, then $2p+3q$ is equal to

(A) 60
(B) 69
(C) 66
(D) 63

Answer: (D) 63 · Key from source paper

Q77 JEE Main 2023 · 8 Apr · Shift 1 MCQ

if the coefficients of three consecutive terms in the expansion of $(1+x)^n$ are the ratio $1:5:20$ then the coefficient of the fourth term is

(A) 2436
(B) 5481
(C) 1827
(D) 3654

Answer: (D) 3654 · Key from source paper

Q78 JEE Main 2023 · 8 Apr · Shift 1 Numerical

Let $[t]$ denote the greatest integer $\leq t$. if the constant term in the expansion of $\left(3x^2 - \frac{1}{2x^5}\right)^7$ is α then $[\alpha]$ is equal to _____

Numerical value type: the answer is a number.

Answer: 1275. · Key from source paper

Q79 JEE Main 2023 · 8 Apr · Shift 2 MCQ

The absolute difference of the coefficients of x^{10} and x^7 in the expansion of $\left(2x^2 + \frac{1}{2x}\right)^{11}$ is equal to

EdLoop JEE

(A) $13^3 - 13$
(B) $11^3 - 11$
(C) $10^3 - 10$
(D) $12^3 - 12$

Answer: (D) $12^3 - 12$ · Key from source paper

Q80 JEE Main 2023 · 8 Apr · Shift 2 MCQ

$25^{190} - 19^{190} - 8^{190} + 2^{190}$ is divisible by

(A) neither 14 nor 34
(B) 14 but not by 34
(C) 34 but not by 14
(D) both 14 and 34

Answer: (C) 34 but not by 14 · Key from source paper

Q81 JEE Main 2023 · 6 Apr · Shift 1 MCQ

If the ratio of the fifth term from the beginning to the fifth term from the end in the expansion of $\left(\sqrt[4]{2} + \frac{1}{\sqrt[4]{3}}\right)^n$ is $\sqrt{6} : 1$, then the third term from the beginning is:

(A) $30\sqrt{2}$
(B) $30\sqrt{3}$
(C) $60\sqrt{2}$
(D) $60\sqrt{3}$

Answer: (D) $60\sqrt{3}$ · Key from source paper

Q82 JEE Main 2023 · 6 Apr · Shift 1 Numerical

The coefficient of x^{18} in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$ is _____ .

Numerical value type: the answer is a number.

Answer: 5005. · Key from source paper

Q83 JEE Main 2023 · 6 Apr · Shift 2 MCQ

If the coefficients of x^7 in $\left(ax^2 + \frac{1}{2bx}\right)^{11}$ and x^{-7} in $\left(ax - \frac{1}{3bx^2}\right)^{11}$ are equal, then

(A) $729ab = 32$
(B) $32ab = 729$
(C) $64ab = 243$
(D) $243ab = 64$

Answer: (A) $729ab = 32$ · Key from source paper

Q84 JEE Main 2023 · 6 Apr · Shift 2 MCQ

Among the statements :

$(S1)$: $2023^{2022} - 1999^{2022}$ is divisible by 8.

$(S2)$: $13(13)^n - 11n - 13$ is divisible by 144 for infinitely many $n \in \mathbb{N}$

(A) Only $(S2)$ is correct

(B) Only $(S1)$ is correct

(C) Both $(S1)$ and $(S2)$ are correct

(D) Both $(S1)$ and $(S2)$ are incorrect

Answer: (C) Both $(S1)$ and $(S2)$ are correct · Checked by our team

Q85 JEE Main 2023 · 1 Feb · Shift 1 MCQ

The value of $\frac{1}{1!50!} + \frac{1}{3!48!} + \frac{1}{5!46!} + \ldots . + \frac{1}{49!2!} + \frac{1}{51!1!}$ is

(A) $\frac{2^{50}}{50!}$

(B) $\frac{2^{50}}{51!}$

(C) $\frac{2^{51}}{51!}$

(D) $\frac{2^{51}}{50!}$

Answer: (B) $\frac{2^{50}}{51!}$ · Key from source paper

Q86 JEE Main 2023 · 1 Feb · Shift 1 Numerical

The remainder when $19^{200} + 23^{200}$ is divided by 49, is _____.

Numerical value type: the answer is a number.

Answer: 29. · Key from source paper

Q87 JEE Main 2023 · 1 Feb · Shift 2 Numerical

If the term without x in the expansion of $\left(x^{\frac{2}{3}} + \frac{\alpha}{x^3}\right)^{22}$ is 7315 , then $|\alpha|$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q88 JEE Main 2023 · 1 Feb · Shift 2 Numerical

Let the sixth term in the binomial expansion of $\left(\sqrt{2^{\log_2(10-3^x)}} + \sqrt[5]{2^{(x-2)\log_2 3}}\right)^{\mathrm{m}}$ powers of $2^{(x-2)\log_2 3}$, be 21 . If the binomial coefficients of the second, third and fourth terms in the expansion are respectively the first, third and fifth terms of an A.P., then the sum of the squares of all possible values of x is _____.

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q89 JEE Main 2023 · 31 Jan · Shift 1 Numerical

Let $\alpha > 0$, be the smallest number such that the expansion of $\left(x^{\frac{2}{3}} + \frac{2}{x^3}\right)^{30}$ has a term $\beta x^{-\alpha}, \beta \in N$. Then α is equal to _____.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q90 JEE Main 2023 · 31 Jan · Shift 1 Numerical

The remainder on dividing 5^{99} by 11 is _____.

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q91 JEE Main 2023 · 31 Jan · Shift 2 Numerical

The coefficient of x^{-6}, in the expansion of $\left(\frac{4x}{5} + \frac{5}{2x^2}\right)^9$, is

Numerical value type: the answer is a number.

Answer: 5040. · Key from source paper

Q92 JEE Main 2023 · 31 Jan · Shift 2 Numerical

If the constant term in the binomial expansion of $\left(\frac{x^{\frac{5}{2}}}{2} - \frac{4}{x^l}\right)^9$ is -84 and the coefficient of x^{-3l} is $2^\alpha \beta$ where $\beta < 0$ is an odd number, then $|\alpha l - \beta|$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 98. · Key from source paper

Q93 JEE Main 2023 · 30 Jan · Shift 1 MCQ

If the coefficient of x^{15} in the expansion of $\left(ax^3 + \frac{1}{bx^{\frac{1}{3}}}\right)^{15}$ is equal to the coefficient of x^{-15} in the expansion of $\left(ax^{\frac{1}{3}} - \frac{1}{bx^3}\right)^{15}$, where a and b are positive real numbers, then for each such ordered pair a, b:

(A) $a = b$

(B) $ab = 1$

(C) $a = 3b$

(D) $ab = 3$

Answer: (B) $ab = 1$ · Key from source paper

Q94 JEE Main 2023 · 30 Jan · Shift 1 MCQ

The coefficient of x^{301} in $1 + x^{500} + x1 + x^{499} + x^2 1 + x^{498} + \ldots + x^{500}$ is:

(A) ${}^{501}C_{302}$
(B) ${}^{500}C_{301}$
(C) ${}^{500}C_{300}$
(D) ${}^{501}C_{200}$

Answer: (D) ${}^{501}C_{200}$ · Key from source paper

Q95 JEE Main 2023 · 30 Jan · Shift 2 MCQ

Let $x = \left(8\sqrt{3} + 13\right)^{13}$ and $y = \left(7\sqrt{2} + 9\right)^{9}$. If $[t]$ denotes the greatest integer $\leq$ t, then

(A) $[x] + [y]$ is even
(B) $[x]$ is odd but $[y]$ is even
(C) $[x]$ is even but $[y]$ is odd
(D) $[x]$ and $[y]$ are both odd

Answer: (A) $[x] + [y]$ **is even** · Key from source paper

Q96 JEE Main 2023 · 30 Jan · Shift 2 Numerical

50th root of a number x is 12 and 50th root of another number y is 18 . Then the remainder obtained on dividing $(x + y)$ by 25 is _____ .

Numerical value type: the answer is a number.

Answer: 23. · Key from source paper

Q97 JEE Main 2023 · 29 Jan · Shift 1 Numerical

Let the coefficients of three consecutive terms in the binomial expansion of $(1 + 2x)^n$ be in the ratio $2 : 5 : 8$. Then the coefficient of the term, which is in the middle of these three terms, is

Numerical value type: the answer is a number.

Answer: 1120. · Key from source paper

Q98 JEE Main 2023 · 29 Jan · Shift 1 Numerical

If the co-efficient of x^9 in $\left(\alpha x^3 + \frac{1}{\beta x}\right)^{11}$ and the co-efficient of x^{-9} in $\left(\alpha x - \frac{1}{\beta x^3}\right)^{11}$ are equal, then $(\alpha\beta)^2$ is equal to

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q99 JEE Main 2023 · 29 Jan · Shift 2 MCQ

Let K be the sum of the coefficients of the odd powers of x in the expansion of $(1+x)^{99}$. Let a be the middle term in the expansion of $\left(2+\frac{1}{\sqrt{2}}\right)^{200}$. If $\frac{{}^{200}C_{99}K}{a}=\frac{2^l m}{n}$, where m and n are odd numbers, then the ordered pair (l,n) is equal to:

(A) $(50,51)$
(B) $(51,99)$
(C) $(50,101)$
(D) $(51,101)$

Answer: (C) $(50,101)$ · Key from source paper

Q100 JEE Main 2023 · 25 Jan · Shift 1 MCQ

If a_r is the coefficient of x^{10-r} in the Binomial expansion of $(1+x)^{10}$, then $\sum_{r=1}^{10} r^3\left(\frac{a_r}{a_{r-1}}\right)^2$ is equal to

(A) 4895
(B) 1210
(C) 5445
(D) 3025

Answer: (B) 1210 · Key from source paper

Q101 JEE Main 2023 · 25 Jan · Shift 1 Numerical

The constant term in the expansion of $\left(2x+\frac{1}{x^7}+3x^2\right)^5$ is _____ .

Numerical value type: the answer is a number.

Answer: 1080. · Key from source paper

Q102 JEE Main 2023 · 25 Jan · Shift 2 Numerical

The remainder when $(2023)^{2023}$ is divided by 35 is

Numerical value type: the answer is a number.

Answer: 7. · Key from source paper

Q103 JEE Main 2023 · 24 Jan · Shift 1 MCQ

The value of $\sum_{r=0}^{22} {}^{22}C_r \cdot {}^{23}C_r$ is

(A) ${}^{45}C_{23}$
(B) ${}^{44}C_{23}$
(C) ${}^{45}C_{24}$
(D) ${}^{44}C_{22}$

Answer: (A) ${}^{45}C_{23}$ · Key from source paper

Q104 JEE Main 2023 · 24 Jan · Shift 1 Numerical

Suppose $\sum_{r=0}^{2023} r^2 \cdot {}^{2023}C_r = 2023 \times \alpha \times 2^{2022}$, then the value of α is

Numerical value type: the answer is a number.

Answer: 1012. · Key from source paper

Q105 JEE Main 2023 · 24 Jan · Shift 2 MCQ

If $\left({}^{30}C_1\right)^2 + 2\left({}^{30}C_2\right)^2 + 3\left({}^{30}C_3\right)^2 \ldots\ldots 30\left({}^{30}C_{30}\right)^2 = \frac{\alpha\, 60!}{(30!)^2}$, then α is equal to

(A) 30
(B) 60
(C) 15
(D) 10

Answer: (C) 15 · Key from source paper

Q106 JEE Main 2023 · 24 Jan · Shift 2 Numerical

Let he sum of the coefficient of first three terms in the expansion of $\left(x - \frac{3}{x^2}\right)^n$; $x \neq 0$, $n \in N$ be 376. Then, the coefficient of x^4 is equal to:

Numerical value type: the answer is a number.

Answer: 405. · Key from source paper

Q107 JEE Main 2022 · 29 Jul · Shift 1 Numerical

Let the ratio of the fifth term from the beginning to the fifth term from the end in the binomial expansion of $\left(\sqrt[4]{2} + \frac{1}{\sqrt[4]{3}}\right)^n$, in the increasing powers of $\frac{1}{\sqrt[4]{3}}$ be $\sqrt[4]{6} : 1$. If the sixth term from the beginning is $\frac{\alpha}{\sqrt[4]{3}}$, then α is equal to _____.

Numerical value type: the answer is a number.

Answer: 84. · Key from source paper

Q108 JEE Main 2022 · 29 Jul · Shift 2 Numerical

If $\sum_{k=1}^{10} K^2 10C_K^2 = 22000\, L$, then L is equal to _____.

Numerical value type: the answer is a number.

Answer: 221. · Key from source paper

Q109 JEE Main 2022 · 28 Jul · Shift 1 MCQ

The remainder when $7^{2022}+3^{2022}$ is divided by 5 is

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

Answer: (C) 3 · Key from source paper

Q110 JEE Main 2022 · 28 Jul · Shift 2 Numerical

Let the coefficients of the middle terms in the expansion of $\left(\frac{1}{\sqrt{6}}+\beta x\right)^4$, $(1-3\beta x)^2$ and $\left(1-\frac{\beta}{2}x\right)^6$, $\beta>0$, respectively form the first three terms of an A.P. If d is the common difference of this A.P., then $50-\frac{2d}{\beta^2}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 57. · Key from source paper

Q111 JEE Main 2022 · 28 Jul · Shift 2 Numerical

If $1+\left(2+{}^{49}C_1+{}^{49}C_2+\ldots.+{}^{49}C_{49}\right)\left({}^{50}C_2+{}^{50}C_4+\ldots..+{}^{50}C_{50}\right)$ is equal to $2^n.m$, where m is odd, then $n+m$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 99. · Key from source paper

Q112 JEE Main 2022 · 27 Jul · Shift 1 MCQ

The remainder when $(2021)^{2022}+(2022)^{2021}$ is divided by 7 is

(A) 0
(B) 1
(C) 2
(D) 6

Answer: (A) 0 · Key from source paper

Q113 JEE Main 2022 · 27 Jul · Shift 2 Numerical

Let for the 9th term in the binomial expansion of $(3+6x)^n$, in the increasing powers of $6x$, to be the greatest for $x=\frac{3}{2}$, the least value of n is n_0. If k is the ratio of the coefficient of x^6 to the coefficient of x^3, then $k+n_0$ is equal to

Numerical value type: the answer is a number.

Answer: 24. · Key from source paper

Q114 JEE Main 2022 · 26 Jul · Shift 1 Numerical

If the coefficients of x and x^2 in the expansion of $(1+x)^p(1-x)^q$, $p, q \leq 15$, are -3 and -5 respectively, then the coefficient of x^3 is equal to _____ .

Numerical value type: the answer is a number.

Answer: 23. · Key from source paper

Q115 JEE Main 2022 · 26 Jul · Shift 2 MCQ

$\sum_{\substack{i,j=0 \\ i\neq j}}^{n} {}^nC_i\,{}^nC_j$ is equal to

(A) $2^{2n} - {}^{2n}C_n$

(B) $2^{2n-1} - {}^{2n-1}C_{n-1}$

(C) $2^{2n} - \frac{1}{2}\,{}^{2n}C_n$

(D) $2^{n-1} + {}^{2n-1}C_n$

Answer: (A) $2^{2n} - {}^{2n}C_n$ · Key from source paper

Q116 JEE Main 2022 · 25 Jul · Shift 1 Numerical

If the maximum value of the term independent of t in the expansion of $\left(t^2 x^{\frac{1}{5}} + \frac{(1-x)^{\frac{1}{10}}}{t}\right)^{15}$, $x \geq 0$, is K, then $8K$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 6006. · Key from source paper

Q117 JEE Main 2022 · 25 Jul · Shift 2 MCQ

The remainder when $(11)^{1011} + (1011)^{11}$ is divided by 9 is _____.

(A) 1

(B) 8

(C) 6

(D) 4

Answer: (B) 8 · Key from source paper

Q118 JEE Main 2022 · 29 Jun · Shift 1 MCQ

If the constant term in the expansion of $\left(3x^3 - 2x^2 + \frac{5}{x^5}\right)^{10}$ is $2^k \cdot l$, where l is an odd integer, then the value of k is equal to

(A) 6
(B) 7
(C) 8
(D) 9

Answer: (D) 9 · Key from source paper

Q119 JEE Main 2022 · 29 Jun · Shift 2 MCQ

Let $n \geq 5$ be an integer. If $9^n - 8n - 1 = 64\alpha$ and $6^n - 5n - 1 = 25\,\beta$, then $\alpha - \beta$ is equal to:

(A) $1 + {}^nC_2(8-5) + {}^nC_3\left(8^2 - 5^2\right) + \ldots + {}^nC_n\left(8^{n-1} - 5^{n-1}\right)$
(B) $1 + {}^nC_3(8-5) + {}^nC_4\left(8^2 - 5^2\right) + \ldots + {}^nC_n\left(8^{n-2} - 5^{n-2}\right)$
(C) ${}^nC_3(8-5) + {}^nC_4\left(8^2 - 5^2\right) + \ldots + {}^nC_n\left(8^{n-2} - 5^{n-2}\right)$
(D) ${}^nC_4(8-5) + {}^nC_5\left(8^2 - 5^2\right) + \ldots + {}^nC_n\left(8^{n-3} - 5^{n-3}\right)$

Answer: (C) ${}^nC_3(8-5) + {}^nC_4\left(8^2 - 5^2\right) + \ldots + {}^nC_n\left(8^{n-2} - 5^{n-2}\right)$ · Key from source paper

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Q120 JEE Main 2022 · 29 Jun · Shift 2 Numerical

Let the coefficients of x^{-1} and x^{-3} in the expansion of $\left(2x^{\frac{1}{5}} - \frac{1}{x^{\frac{1}{5}}}\right)^{15}$, $x > 0$, be m and n respectively. If r is a positive integer such $mn^2 = {}^{15}C_r \cdot 2^r$, then the value of r is equal to _____.

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q121 JEE Main 2022 · 28 Jun · Shift 1 MCQ

If $\sum_{k=1}^{31}\left({}^{31}\mathrm{C}_k\right)\left({}^{31}\mathrm{C}_{k-1}\right) - \sum_{k=1}^{30}\left({}^{30}\mathrm{C}_k\right)\left({}^{30}\mathrm{C}_{k-1}\right) = \frac{\alpha(60!)}{(30!)(31!)}$, where $\alpha \in R$, then the value of 16α is equal to

(A) 1411
(B) 1320
(C) 1615
(D) 1855

Answer: (A) 1411 · Key from source paper

Q122 JEE Main 2022 · 28 Jun · Shift 1 Numerical

The number of positive integers k such that the constant term in the binomial expansion of $\left(2x^3 + \frac{3}{x^k}\right)^{12}$, $x \neq 0$ is $2^8 \cdot l$, where l is an odd integer, is _____.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q123 JEE Main 2022 · 28 Jun · Shift 2 MCQ

The term independent of x in the expression of $\left(1-x^2+3x^3\right)\left(\frac{5}{2}x^3-\frac{1}{5x^2}\right)^{11}$, $x \neq 0$ is

(A) $\frac{7}{40}$
(B) $\frac{33}{200}$
(C) $\frac{39}{200}$
(D) $\frac{11}{50}$

Answer: (B) $\frac{33}{200}$ · Key from source paper

Q124 JEE Main 2022 · 27 Jun · Shift 1 Numerical

If the coefficient of x^{10} in the binomial expansion of $\left(\frac{\sqrt{x}}{5^{\frac{1}{4}}}+\frac{\sqrt{5}}{x^{\frac{1}{3}}}\right)^{60}$ is $5^k l$, where $l, k \in N$ and l is coprime to 5, then k is equal to _____ .

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q125 JEE Main 2022 · 27 Jun · Shift 2 Numerical

If the sum of the coefficients of all the positive powers of x, in the binomial expansion of $\left(x^n+\frac{2}{x^5}\right)^7$ is 939, then the sum of all the possible integral values of n is

Numerical value type: the answer is a number.

Answer: 57. · Key from source paper

Q126 JEE Main 2022 · 26 Jun · Shift 1 MCQ

The remainder when $(2021)^{2023}$ is divided by 7 is

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

Answer: (D) 5 · Key from source paper

Q127 JEE Main 2022 · 26 Jun · Shift 2 Numerical

If ${}^{40}C_0+{}^{41}C_1+{}^{42}C_2+\cdots+{}^{60}C_{20}=\frac{m}{n}\times{}^{60}C_{20}$ where m & n are co-prime, then $m+n$ is equal to

Numerical value type: the answer is a number.

Answer: 102. · Key from source paper

Q128 JEE Main 2022 · 25 Jun · Shift 1 Numerical

Let C_r denote the binomial coefficient of x^r in the expansion of $(1+x)^{10}$. If for $\alpha, \beta \in R$, $C_1 + 3 \cdot 2C_2 + 5 \cdot 3C_3 + \ldots$ upto 10 terms $= \frac{\alpha \times 2^{11}}{2^\beta - 1}(C_0 + \frac{C_1}{2} + \frac{C_2}{3} + \ldots$ upto 10 terms) then the value of $\alpha + \beta$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 286. · Key from source paper

Q129 JEE Main 2022 · 25 Jun · Shift 2 MCQ

The coefficient of x^{101} in the expression
$5 + x^{500} + x5 + x^{499} + x^2 5 + x^{498} + \ldots\ldots + x^{500}$, $x > 0$ is

(A) ${}^{501}C_{101} \times 5^{399}$
(B) ${}^{501}C_{101} \times 5^{400}$
(C) ${}^{501}C_{100} \times 5^{400}$
(D) ${}^{500}C_{101} \times 5^{399}$

Answer: (A) ${}^{501}C_{101} \times 5^{399}$ · Key from source paper

Q130 JEE Main 2022 · 25 Jun · Shift 2 Numerical

If the sum of the co-efficients of all the positive even powers of x in the binomial expansion of $\left(2x^3 + \frac{3}{x}\right)^{10}$ is $5^{10} - \beta \cdot 3^9$, then β is equal to _____ .

Numerical value type: the answer is a number.

Answer: 83. · Key from source paper

Q131 JEE Main 2022 · 24 Jun · Shift 1 MCQ

The remainder when 3^{2022} is divided by 5 is

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

Answer: (D) 4 · Key from source paper

Q132 JEE Main 2022 · 24 Jun · Shift 2 Numerical

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

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q133 JEE Main 2021 · 1 Sep · Shift 2 Numerical

If the sum of the coefficients in the expansion of $(x+y)^n$ is 4096, then the greatest coefficient in the expansion is _____.

Numerical value type: the answer is a number.

Answer: 924. · Key from source paper

Q134 JEE Main 2021 · 31 Aug · Shift 1 Numerical

If $\left(\frac{3^6}{4^4}\right)k$ is the term, independent of x, in the binomial expansion of $\left(\frac{x}{4}-\frac{12}{x^2}\right)^{12}$, then k is equal to _____

Numerical value type: the answer is a number.

Answer: 55. · Key from source paper

Q135 JEE Main 2021 · 31 Aug · Shift 2 Numerical

If the coefficient of a^7b^8 in the expansion of $(a+2b+4ab)^{10}$ is $K\cdot 2^{16}$, then K is equal to

Numerical value type: the answer is a number.

Answer: 315. · Key from source paper

Q136 JEE Main 2021 · 27 Aug · Shift 1 MCQ

$\sum_{k=0}^{20}\left({}^{20}C_k\right)^2$ is equal to

(A) ${}^{40}C_{21}$

(B) ${}^{41}C_{20}$

(C) ${}^{40}C_{20}$

(D) ${}^{40}C_{19}$

Answer: (C) ${}^{40}C_{20}$ · Key from source paper

Q137 JEE Main 2021 · 27 Aug · Shift 2 Numerical

$3\times 7^{22}+2\times 10^{22}-44$ when divided by 18 leaves the remainder

Numerical value type: the answer is a number.

Answer: 15. · Key from source paper

Q138 JEE Main 2021 · 26 Aug · Shift 1 MCQ

If ${}^{20}\mathrm{C}_r$ is the co-efficient of x^r in the expansion of $(1+x)^{20}$, then the value of $\sum_{r=0}^{20} r^2\left({}^{20}\mathrm{C}_r\right)$ is equal to:

(A) 420×2^{18}
(B) 380×2^{18}
(C) 380×2^{19}
(D) 420×2^{19}

Answer: (A) 420×2^{18} · Key from source paper

Q139 JEE Main 2021 · 26 Aug · Shift 2 Numerical

Let $\binom{n}{k}$ denote ${}^nC_k$ and $\begin{bmatrix} n \\ k \end{bmatrix} = \begin{cases} \binom{n}{k}, & \text{if } 0 \le k \le n \\ 0, & \text{otherwise} \end{cases}$. If $A_k = \sum_{i=0}^{9} \binom{9}{i} \begin{bmatrix} 12 \\ 12-k+i \end{bmatrix} + \sum_{i=0}^{8} \binom{8}{i} \begin{bmatrix} 13 \\ 13-k+i \end{bmatrix}$ and $A_4 - A_3 = 190p$, then p is equal to _____.

Numerical value type: the answer is a number.

Answer: 49. · Key from source paper

Q140 JEE Main 2021 · 27 Jul · Shift 1 MCQ

If the coefficients of x^7 in $\left(x^2 + \frac{1}{bx}\right)^{11}$ and x^{-7} in $\left(x - \frac{1}{bx^2}\right)^{11}$, $b \neq 0$, are equal, then the value of b is equal to:

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

Answer: (C) 1 · Key from source paper

Q141 JEE Main 2021 · 27 Jul · Shift 2 MCQ

A possible value of x, for which the ninth term in the expansion of $\left\{3^{\log_3 \sqrt{25^{x-1}+7}} + 3^{\left(-\frac{1}{8}\right)\log_3\left(5^{x-1}+1\right)}\right\}^{10}$ in the increasing powers of $3^{\left(-\frac{1}{8}\right)\log_3\left(5^{x-1}+1\right)}$ is equal to 180, is :

(A) 0
(B) -1
(C) 2
(D) 1

Answer: (D) 1 · Key from source paper

Q142 JEE Main 2021 · 25 Jul · Shift 1 MCQ

If b is very small as compared to the value of a, so that the cube and other higher powers of $\frac{b}{a}$ can be neglected in the identity

$\frac{1}{a-b} + \frac{1}{a-2b} + \frac{1}{a-3b} + \ldots + \frac{1}{a-nb} = \alpha n + \beta n^2 + \gamma n^3$

then the value of γ is :

(A) $\frac{a^2+b}{3a^3}$
(B) $\frac{a+b}{3a^2}$
(C) $\frac{b^2}{3a^3}$
(D) $\frac{a+b^2}{3a^3}$

Answer: (C) $\frac{b^2}{3a^3}$ · Key from source paper

Q143 JEE Main 2021 · 25 Jul · Shift 1 Numerical

The ratio of the coefficient of the middle term in the expansion of $(1+x)^{20}$ and the sum of the coefficients of two middle terms in expansion of $(1+x)^{19}$ is _____.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q144 JEE Main 2021 · 25 Jul · Shift 1 Numerical

The term independent of x in the expansion of $\frac{x+1}{x^{2/3}-x^{1/3}+1} - \frac{x-1}{x-x^{1/2}}^{10}$, where $x \neq 0, 1$ is equal to

Numerical value type: the answer is a number.

Answer: 210. · Key from source paper

Q145 JEE Main 2021 · 25 Jul · Shift 2 MCQ

The sum of all those terms which are rational numbers in the expansion of $\left(2^{\frac{1}{3}}+3^{\frac{1}{4}}\right)^{12}$ is:

(A) 89
(B) 27
(C) 35
(D) 43

Answer: (D) 43 · Key from source paper

Q146 JEE Main 2021 · 25 Jul · Shift 2 MCQ

If the greatest value of the term independent of x in the expansion of $\left(x\sin\alpha + a\frac{\cos\alpha}{x}\right)^{10}$ is $\frac{10!}{(5!)^2}$, then the value of a is equal to:

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

Options (4) or (3) were accepted. More than one answer was accepted. · Key from source paper

Q147 JEE Main 2021 · 25 Jul · Shift 2 MCQ

The lowest integer which is greater than $\left(1+\frac{1}{10^{100}}\right)^{10^{100}}$ is

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

Answer: (A) 3 · Key from source paper

Q148 JEE Main 2021 · 25 Jul · Shift 2 Numerical

Let $n \in \mathbf{N}$ and $[x]$ denote the greatest integer less than or equal to x. If the sum of $(n+1)$ terms of ${}^nC_0, 3 \cdot {}^nC_1, 5 \cdot {}^nC_2, 7 \cdot {}^nC_3, \ldots$ is equal to $2^{100} \cdot 101$, then $2\left[\frac{n-1}{2}\right]$ is equal to

Numerical value type: the answer is a number.

Answer: 98. · Key from source paper

Q149 JEE Main 2021 · 25 Jul · Shift 2 Numerical

If the co-efficient of x^7 and x^8 in the expansion of $\left(2+\frac{x}{3}\right)^n$ are equal, then the value of n is equal to :

Numerical value type: the answer is a number.

Answer: 55. · Key from source paper

Q150 JEE Main 2021 · 22 Jul · Shift 1 Numerical

If the constant term, in binomial expansion of $\left(2x^r + \frac{1}{x^2}\right)^{10}$ is 180, then r is equal to _____.

Numerical value type: the answer is a number.

Answer: 8. · Key from source paper

Q151 JEE Main 2021 · 20 Jul · Shift 1 MCQ

The coefficient of x^{256} in the expansion of $(1-x)^{101}\left(x^2+x+1\right)^{100}$ is:

(A) ${}^{100}C_{16}$
(B) ${}^{100}C_{15}$
(C) ${}^{-100}C_{16}$
(D) ${}^{-100}C_{15}$

Answer: (B) ${}^{100}C_{15}$ · Key from source paper

Q152 JEE Main 2021 · 20 Jul · Shift 1 Numerical

The number of rational terms in the binomial expansion of $\left(4^{\frac{1}{4}} + 5^{\frac{1}{6}}\right)^{120}$ is _____.

Numerical value type: the answer is a number.

Answer: 21. · Key from source paper

Q153 JEE Main 2021 · 20 Jul · Shift 2 MCQ

For the natural numbers m, n, if $(1-y)^m(1+y)^n = 1 + a_1y + a_2y^2 + \ldots + a_{m+n}y^{m+n}$ and $a_1 = a_2 = 10$, then the value of $m+n$ is equal to:

(A) 88
(B) 64
(C) 100
(D) 80

Answer: (D) 80 · Key from source paper

Q154 JEE Main 2021 · 18 Mar · Shift 1 MCQ

Let $\left(1+x+2x^2\right)^{20} = a_0 + a_1x + a_2x^2 + \ldots + a_{40}x^{40}$, then $a_1 + a_3 + a_5 + \ldots + a_{37}$ is equal to

(A) $2^{20}\left(2^{20}-21\right)$
(B) $2^{19}\left(2^{20}-21\right)$
(C) $2^{19}\left(2^{20}+21\right)$
(D) $2^{20}\left(2^{20}+21\right)$

Answer: (B) $2^{19}\left(2^{20}-21\right)$ · Key from source paper

Q155 JEE Main 2021 · 18 Mar · Shift 2 Numerical

The term independent of x in the expansion of $\left[\frac{x+1}{x^{2/3}-x^{1/3}+1} - \frac{x-1}{x-x^{1/2}}\right]^{10}$, $x \neq 1$, is equal to _____ .

Numerical value type: the answer is a number.

Answer: 210. · Key from source paper

Q156 JEE Main 2021 · 18 Mar · Shift 2 Numerical

Let ${}^nC_r$ denote the binomial coefficient of x^r in the expansion of $(1+x)^n$. If $\sum_{k=0}^{10}\left(2^2+3k\right)^n C_k = \alpha \cdot 3^{10} + \beta \cdot 2^{10}$, $\alpha, \beta \in R$, then $\alpha + \beta$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 19. · Key from source paper

Q157 JEE Main 2021 · 17 Mar · Shift 1 MCQ

If the fourth term in the expansion of $\left(x + x^{\log_2 x}\right)^7$ is 4480, then the value of x where $x \in N$ is equal to:

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

Answer: (A) 2 · Key from source paper

Q158 JEE Main 2021 · 17 Mar · Shift 1 · Numerical

If $(2021)^{3762}$ is divided by 17, then the remainder is _____.

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q159 JEE Main 2021 · 17 Mar · Shift 2 · MCQ

The value of $\sum_{r=0}^{6}\left({}^{6}C_{r}\cdot{}^{6}C_{6-r}\right)$ is equal to :

(A) 1124
(B) 1324
(C) 1024
(D) 924

Answer: (D) 924 · Key from source paper

Q160 JEE Main 2021 · 16 Mar · Shift 1 · MCQ

If n is the number of irrational terms in the expansion of $\left(3^{1/4}+5^{1/8}\right)^{60}$, then $(n-1)$ is divisible by :

(A) 26
(B) 30
(C) 8
(D) 7

Answer: (A) 26 · Key from source paper

Q161 JEE Main 2021 · 16 Mar · Shift 1 · MCQ

Let $[x]$ denote greatest integer less than or equal to x. If for $n\in N$, $\left(1-x+x^{3}\right)^{n}=\sum_{j=0}^{3n}a_{j}x^{j}$, then $\sum_{j=0}^{\left[\frac{3n}{2}\right]}a_{2j}+4\sum_{j=0}^{\left[\frac{3n-1}{2}\right]}a_{2j+1}$ is equal to :

(A) 2
(B) 2^{n-1}
(C) 1
(D) n

Answer: (C) 1 · Key from source paper

EdLoop JEE

Q162 JEE Main 2021 · 16 Mar · Shift 2 Numerical

Let n be a positive integer. Let $A = \sum_{k=0}^{n}(-1)^k \times {}^nC_k \left[\left(\frac{1}{2}\right)^k + \left(\frac{3}{4}\right)^k + \left(\frac{7}{8}\right)^k + \left(\frac{15}{16}\right)^k + \left(\frac{31}{32}\right)^k\right]$. If $63A = 1 - \frac{1}{2^{30}}$, then n is equal to _____.

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q163 JEE Main 2021 · 26 Feb · Shift 1 MCQ

The maximum value of the term independent of t in the expansion of $\left(tx^{\frac{1}{5}} + \frac{(1-x)^{\frac{1}{10}}}{t}\right)^{10}$ where $x \in (0, 1)$ is:

(A) $\frac{10!}{\sqrt{3}(5!)^2}$

(B) $\frac{10!}{3(5!)^2}$

(C) $\frac{2.10!}{3\sqrt{3}(5!)^2}$

(D) $\frac{2.10!}{3(5!)^2}$

Answer: (C) $\frac{2.10!}{3\sqrt{3}(5!)^2}$ · Key from source paper

Q164 JEE Main 2021 · 26 Feb · Shift 1 Numerical

Let $m, n \in N$ and $\gcd(2, n) = 1$. If $30\binom{30}{0} + 29\binom{30}{1} + \ldots\ldots + 2\binom{30}{28} + 1\binom{30}{29} = n \cdot 2^m$, then $n + m$ is equal to _____. (Here $\binom{n}{k} = {}^nC_k$)

Numerical value type: the answer is a number.

Answer: 45. · Key from source paper

Q165 JEE Main 2021 · 25 Feb · Shift 2 Numerical

The total number of two digit numbers 'n', such that $3^n + 7^n$ is a multiple of 10 , is _____.

Numerical value type: the answer is a number.

Answer: 45. · Key from source paper

Q166 JEE Main 2021 · 25 Feb · Shift 2 Numerical

If the remainder when x is divided by 4 is 3, then the remainder when $(2020 + x)^{2022}$ is divided by 8 is _____.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q167 JEE Main 2021 · 24 Feb · Shift 1 MCQ

The value of $-{}^{15}C_1 + 2 \cdot {}^{15}C_2 - 3 \cdot {}^{15}C_3 + \ldots\ldots - 15 \cdot {}^{15}C_{15} + {}^{14}C_1 + {}^{14}C_3 + {}^{14}C_5 + \ldots. + {}^{14}C_{11}$ is equal to

(A) 2^{14}

(B) $2^{13} - 13$

(C) $2^{16} - 1$

(D) $2^{13} - 14$

Answer: (D) $2^{13} - 14$ · Key from source paper

Q168 JEE Main 2021 · 24 Feb · Shift 2 MCQ

If $n \geqslant 2$ is a positive integer, then the sum of the series ${}^{n+1}C_2 + 2\left({}^2C_2 + {}^3C_2 + {}^4C_2 + \ldots + {}^nC_2\right)$ is

(A) $\frac{n(n-1)(2n+1)}{6}$

(B) $\frac{n(n+1)(2n+1)}{6}$

(C) $\frac{n(n+1)^2(n+2)}{12}$

(D) $\frac{n(2n+1)(3n+1)}{6}$

Answer: (B) $\frac{n(n+1)(2n+1)}{6}$ · Key from source paper

Q169 JEE Main 2021 · 24 Feb · Shift 2 Numerical

For integers n and r, let $\binom{n}{r} = \begin{cases} {}^nC_r, & \text{if } n \geq r \geq 0 \\ 0, & \text{otherwise} \end{cases}$. The maximum value of k for which the sum $\sum_{i=0}^{k} \binom{10}{i}\binom{15}{k-i} + \sum_{i=0}^{k+1} \binom{12}{i}\binom{13}{k+1-i}$ is maximum, is equal to _____.

Numerical value type: the answer is a number.

Answer: 12. · Key from source paper

Q170 JEE Main 2020 · 6 Sep · Shift 1 MCQ

If $\{p\}$ denotes the fractional part of the number p, then $\left\{\frac{3^{200}}{8}\right\}$ is equal to

(A) $\frac{5}{8}$

(B) $\frac{7}{8}$

(C) $\frac{3}{8}$

(D) $\frac{1}{8}$

Answer: (D) $\frac{1}{8}$ · Key from source paper

Q171 JEE Main 2020 · 6 Sep · Shift 2 MCQ

If the constant term in the binomial expansion of $\left(\sqrt{x} - \frac{k}{x^2}\right)^{10}$ is 405, then $|k|$ equals :

(A) 9
(B) 1
(C) 3
(D) 2

Answer: (C) 3 · Key from source paper

Q172 JEE Main 2020 · 5 Sep · Shift 1 Numerical

The natural number m, for which the coefficient of x in the binomial expansion of $\left(x^m + \frac{1}{x^2}\right)^{22}$ is 1540, is

Numerical value type: the answer is a number.

Answer: 13. · Key from source paper

Q173 JEE Main 2020 · 5 Sep · Shift 2 Numerical

The coefficient of x^4 in the expansion of $(1 + x + x^2 + x^3)^6$ in powers of x, is _____

Numerical value type: the answer is a number.

Answer: 120. · Key from source paper

Q174 JEE Main 2020 · 4 Sep · Shift 1 MCQ

The value of $\sum_{r=0}^{20} {}^{50-r}C_6$ is equal to:

(A) ${}^{51}C_7 - {}^{30}C_7$
(B) ${}^{50}C_7 - {}^{30}C_7$
(C) ${}^{50}C_6 - {}^{30}C_6$
(D) ${}^{51}C_7 + {}^{30}C_7$

Answer: (A) ${}^{51}C_7 - {}^{30}C_7$ · Key from source paper

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Q175 JEE Main 2020 · 4 Sep · Shift 1 Numerical

Let $\left(2x^2 + 3x + 4\right)^{10} = \sum_{r=0}^{20} a_r x^r$. Then $\frac{a_7}{a_{13}}$ is equal to _____

Numerical value type: the answer is a number.

Answer: 8. · Key from source paper

Q176 JEE Main 2020 · 4 Sep · Shift 2 MCQ

If for some positive integer n, the coefficients of three consecutive terms in the binomial expansion of $(1 + x)^{n+5}$ are in the ratio $5 : 10 : 14$, then the largest coefficient in the expansion is :

(A) 462
(B) 330
(C) 792
(D) 252

Answer: (A) 462 · Key from source paper

Q177 JEE Main 2020 · 3 Sep · Shift 1 MCQ

If the number of integral terms in the expansion of $\left(3^{\frac{1}{2}}+5^{\frac{1}{8}}\right)^{n}$ is exactly 33, then the least value of n is

(A) 264
(B) 128
(C) 256
(D) 248

Answer: (C) 256 · Key from source paper

Q178 JEE Main 2020 · 3 Sep · Shift 2 MCQ

If the term independent of x in the expansion of $\left(\frac{3}{2}x^{2}-\frac{1}{3x}\right)^{9}$ is k, then $18k$ is equal to:

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

Answer: (D) 7 · Key from source paper

Q179 JEE Main 2020 · 2 Sep · Shift 1 MCQ

Let $\alpha>0,\beta>0$ be such that $\alpha^{3}+\beta^{2}=4$. If the maximum value of the term independent of x in the binomial expansion of $\left(\alpha x^{\frac{1}{9}}+\beta x^{-\frac{1}{6}}\right)^{10}$ is $10k$, then k is equal to

(A) 336
(B) 352
(C) 84
(D) 176

Answer: (A) 336 · Key from source paper

Q180 JEE Main 2020 · 2 Sep · Shift 2 Numerical

For a positive integer n, $\left(1+\frac{1}{x}\right)^{n}$ is expanded in increasing powers of x. If three consecutive coefficients in this expansion are in the ratio, $2:5:12$, then n is equal to

Numerical value type: the answer is a number.

Answer: 118. · Key from source paper

Q181 JEE Main 2020 · 9 Jan · Shift 1 Numerical

The coefficient of x^4 in the expansion of $\left(1+x+x^2\right)^{10}$ is _____.

Numerical value type: the answer is a number.

Answer: 615. · Key from source paper

Q182 JEE Main 2020 · 9 Jan · Shift 2 MCQ

In the expansion of $\left(\frac{x}{\cos\theta}+\frac{1}{x\sin\theta}\right)^{16}$, if l_1 is the least value of the term independent of x when $\frac{\pi}{8} \leq \theta \leq \frac{\pi}{4}$ and l_2 is the least value of the term independent of x when $\frac{\pi}{16} \leq \theta \leq \frac{\pi}{8}$, then the ratio $l_2 : l_1$ is equal to:

(A) $1:8$

(B) $16:1$

(C) $8:1$

(D) $1:16$

Answer: (B) $16:1$ · Key from source paper

Q183 JEE Main 2020 · 9 Jan · Shift 2 Numerical

If $C_r \equiv {}^{25}C_r$ and $C_0+5\cdot C_1+9\cdot C_2+\ldots+(101)\cdot C_{25}=2^{25}\cdot k$, then k is equal to _____.

Numerical value type: the answer is a number.

Answer: 51. · Key from source paper

Q184 JEE Main 2020 · 8 Jan · Shift 2 MCQ

If α and β, be the coefficients of x^4 and x^2, respectively in the expansion of $\left(x+\sqrt{x^2-1}\right)^6+\left(x-\sqrt{x^2-1}\right)^6$, then

(A) $\alpha+\beta=60$

(B) $\alpha+\beta=-30$

(C) $\alpha-\beta=60$

(D) $\alpha-\beta=-132$

Answer: (D) $\alpha-\beta=-132$ · Key from source paper

Q185 JEE Main 2020 · 7 Jan · Shift 1 Numerical

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

Numerical value type: the answer is a number.

Answer: 30. · Key from source paper

Q186 JEE Main 2020 · 7 Jan · Shift 2 MCQ

The coefficient of x^7 in the expression $(1+x)^{10}+x(1+x)^9+x^2(1+x)^8+\ldots+x^{10}$, is

(A) 210
(B) 330
(C) 120
(D) 420

Answer: (B) 330 · Key from source paper

Q187 JEE Main 2019 · 12 Apr · Shift 1 MCQ

The coefficient of x^{18} in the product $1+x1-x^{10}1+x+x^{29}$ is

(A) 84
(B) -84
(C) -126
(D) 126

Answer: (A) 84 · Key from source paper

Q188 JEE Main 2019 · 12 Apr · Shift 2 MCQ

If ${}^{20}C_1+(2^2)\,{}^{20}C_2+(3^2)\,{}^{20}C_3+\ldots\ldots+(20^2)\,{}^{20}C_{20}=A(2^\beta)$, then the ordered pair (A,β) is equal to

(A) $(380,\ 19)$
(B) $(420,\ 18)$
(C) $(420,\ 19)$
(D) $(380,\ 18)$

Answer: (B) $(420,\ 18)$ · Key from source paper

Q189 JEE Main 2019 · 12 Apr · Shift 2 MCQ

The term independent of x in the expansion of $\left(\frac{1}{60}-\frac{x^8}{81}\right).\left(2x^2-\frac{3}{x^2}\right)^6$ is equal to

(A) -72
(B) 36
(C) -108
(D) -36

Answer: (D) -36 · Key from source paper

EdLoop JEE

Q190 JEE Main 2019 · 10 Apr · Shift 1 MCQ

If the coefficients of x^2 and x^3, are both zero, in the expansion of the expression $\left(1+ax+bx^2\right)(1-3x)^{15}$, in powers of x , then the ordered pair (a, b) is equal to

(A) $(28, 315)$
(B) $(-21, 714)$
(C) $(28, 861)$
(D) $(-54, 315)$

Answer: (A) $(28, 315)$ · Key from source paper

Q191 JEE Main 2019 · 10 Apr · Shift 2 MCQ

The smallest natural number n , such that the coefficient of x in the expansion of $\left(x^2+\frac{1}{x^3}\right)^n$ is ${}^nC_{23}$, is

(A) 58
(B) 38
(C) 35
(D) 23

Answer: (B) 38 · Key from source paper

Q192 JEE Main 2019 · 9 Apr · Shift 1 MCQ

If the fourth term in the Binomial expansion of $\left(\frac{2}{x}+x^{\log_8 x}\right)^6$, $(x>0)$ is 20×8^7, then a value of x is

(A) 8^{-2}
(B) 8
(C) 8^3
(D) 8^2

Answer: (D) 8^2 · Key from source paper

Q193 JEE Main 2019 · 9 Apr · Shift 2 MCQ

If some three consecutive coefficients in the binomial expansion of $(x+1)^n$ in powers of x are in the ratio 2 : 15 : 70, then the average of these three coefficients is:

(A) 227
(B) 964
(C) 625
(D) 232

Answer: (D) 232 · Key from source paper

Q194 JEE Main 2019 · 8 Apr · Shift 1 MCQ

The sum of the co-efficient of all even degree terms in x in the expansion of $x+\sqrt{x^3-1}^6+x-\sqrt{x^3-1}^6$, $x>1$ is equal to

(A) 26
(B) 32
(C) 24
(D) 29

Answer: (C) 24 · Key from source paper

Q195 JEE Main 2019 · 8 Apr · Shift 1 MCQ

The sum of the series $2.{}^{20}C_0+5.{}^{20}C_1+8.{}^{20}C_2+11.{}^{20}C_3+\ldots\ldots+62.{}^{20}C_{20}$ is equal to

(A) 2^{26}
(B) 2^{25}
(C) 2^{24}
(D) 2^{23}

Answer: (B) 2^{25} · Key from source paper

Q196 JEE Main 2019 · 8 Apr · Shift 2 MCQ

If the fourth term in the binomial expansion of $\left(\sqrt{x^{\frac{1}{1+\log_{10}x}}}+x^{\frac{1}{12}}\right)^6$ is equal to 200, and $x>1$, then the value of x is

(A) 100
(B) 10^4
(C) 10^3
(D) 10

Answer: (D) 10 · Key from source paper

Q197 JEE Main 2019 · 12 Jan · Shift 1 MCQ

A ratio of the 5th term from the beginning to the 5th term from the end in the binomial expansion of $\left(2^{\frac{1}{3}}+\frac{1}{2(3)^{\frac{1}{3}}}\right)^{10}$ is

(A) $1:4(16)^{\frac{1}{3}}$
(B) $4(36)^{\frac{1}{3}}:1$
(C) $2(36)^{\frac{1}{3}}:1$
(D) $1:2(6)^{\frac{1}{3}}$

Answer: (B) $4(36)^{\frac{1}{3}}:1$ · Key from source paper

Q198 JEE Main 2019 · 12 Jan · Shift 2 MCQ

The total number of irrational terms in the binomial expansion of $\left(7^{\frac{1}{5}}-3^{\frac{1}{10}}\right)^{60}$ is

(A) 48
(B) 55
(C) 54
(D) 49

Answer: (C) 54 · Key from source paper

Q199 JEE Main 2019 · 11 Jan · Shift 1 MCQ

The sum of the real values of x for which the middle term in the binomial expansion of $\left(\frac{x^3}{3}+\frac{3}{x}\right)^8$ equals 5670 is :

(A) 0
(B) 6
(C) 4
(D) 8

Answer: (A) 0 · Key from source paper

Q200 JEE Main 2019 · 11 Jan · Shift 1 MCQ

The value of r for which
$^{20}C_r\,{}^{20}C_0+{}^{20}C_{r-1}\,{}^{20}C_1+{}^{20}C_{r-2}\,{}^{20}C_2+\ldots+{}^{20}C_0\,{}^{20}C_r$
is maximum, is:

(A) 15
(B) 20
(C) 11
(D) 10

Answer: (B) 20 · Key from source paper

Q201 JEE Main 2019 · 11 Jan · Shift 2 MCQ

Let $S_n=1+q+q^2+\ldots.+q^n$ and $T_n=1+\left(\frac{q+1}{2}\right)+\left(\frac{q+1}{2}\right)^2+\ldots+\left(\frac{q+1}{2}\right)^n$ where q is a real number and $q\neq 1$. If $^{101}C_1+{}^{101}C_2\cdot S_1+\ldots.+{}^{101}C_{101}\cdot S_{100}=\alpha T_{100}$, then α is equal to :

(A) 2^{99}
(B) 202
(C) 200
(D) 2^{100}

Answer: (D) 2^{100} · Key from source paper

EdLoop JEE

Q202 JEE Main 2019 · 11 Jan · Shift 2 MCQ

Let $(x+10)^{50}+(x-10)^{50}=a_0+a_1x+a_2x^2+....+a_{50}x^{50}$, for all $x\in\mathbf{R}$; then $\frac{a_2}{a_0}$ is equal to :

(A) 12.5
(B) 12
(C) 12.25
(D) 12.75

Answer: (C) 12.25 · Key from source paper

Q203 JEE Main 2019 · 10 Jan · Shift 1 MCQ

If the third term in the binomial expansion of $\left(1+x^{\log_2 x}\right)^5$ equals 2560, then a possible value of x is

(A) $4\sqrt{2}$
(B) $\frac{1}{8}$
(C) $2\sqrt{2}$
(D) $\frac{1}{4}$

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

Q204 JEE Main 2019 · 10 Jan · Shift 2 MCQ

If $\sum_{r=0}^{25}\left\{\left({}^{50}C_r\right)\left({}^{50-r}C_{25-r}\right)\right\}=K\left({}^{50}C_{25}\right)$, then K is equal to

(A) 2^{25}
(B) $2^{25}-1$
(C) 2^{24}
(D) $(25)^2$

Answer: (A) 2^{25} · Key from source paper

Q205 JEE Main 2019 · 10 Jan · Shift 2 MCQ

The positive value of λ for which the co-efficient of x^2 in the expansion $x^2\left(\sqrt{x}+\frac{\lambda}{x^2}\right)^{10}$ is 720, is

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

Answer: (C) 4 · Key from source paper

Q206 JEE Main 2019 · 9 Jan · Shift 1 MCQ

If the fractional part of the number $\frac{2^{403}}{15}$ is $\frac{k}{15}$, then k is equal to

(A) 4
(B) 14
(C) 8
(D) 6

Answer: (C) 8 · Key from source paper

Q207 JEE Main 2019 · 9 Jan · Shift 2 MCQ

The coefficient of t^4 in the expansion of $\left(\frac{1-t^6}{1-t}\right)^3$ is

(A) 10
(B) 14
(C) 15
(D) 12

Answer: (C) 15 · Key from source paper

Q208 JEE Main 2018 · 16 Apr · Online MCQ

The coefficient of x^2 in the expansion of the product $(2-x^2)\left\{(1+2x+3x^2)^6+(1-4x^2)^6\right\}$ is

(A) 107
(B) 108
(C) 155
(D) 106

Answer: (D) 106 · Key from source paper

Q209 JEE Main 2018 · 15 Apr · Shift 1 MCQ

If n is the degree of the polynomial,
$\left[\frac{2}{\sqrt{5x^3+1}-\sqrt{5x^3-1}}\right]^8+\left[\frac{2}{\sqrt{5x^3+1}+\sqrt{5x^3-1}}\right]^8$
and m is the coefficient of x^{n} in it, then the ordered pair (n,m) is equal to

(A) $(12,(20)^4)$
(B) $(8,5(10)^4)$
(C) $(24,(10)^8)$
(D) $(12,8(10)^4)$

Answer: (A) $(12,(20)^4)$ · Checked by our team

Q210 JEE Main 2018 · 15 Apr · Shift 2 MCQ

The coefficient of x^{10} in the expansion of $(1+x)^2(1+x^2)^3(1+x^3)^4$ is equal to

(A) 52
(B) 44
(C) 50
(D) 56

Answer: (A) 52 · Key from source paper

Q211 JEE Main 2018 · 8 Apr · Offline MCQ

The sum of the co-efficient of all odd degree terms in the expansion of $\left(x+\sqrt{x^3-1}\right)^5+\left(x-\sqrt{x^3-1}\right)^5,\ (x>1)$ is

(A) 2
(B) -1
(C) 0
(D) 1

Answer: (A) 2 · Key from source paper

Q212 JEE Main 2017 · 9 Apr · Online MCQ

The coefficient of x^{-5} in the binomial expansion of $\left(\frac{x+1}{x^{\frac{2}{3}}-x^{\frac{1}{3}}+1}-\frac{x-1}{x-x^{\frac{1}{2}}}\right)^{10}$ where $x \neq 0, 1$ is

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

Answer: (C) 1 · Key from source paper

Q213 JEE Main 2017 · 8 Apr · Online MCQ

If $(27)^{999}$ is divided by 7, then the remainder is

(A) 3
(B) 1
(C) 6
(D) 2

Answer: (C) 6 · Key from source paper

Q214 JEE Main 2017 · 2 Apr · Offline MCQ

The value of ${}^{21}C_1-{}^{10}C_1+{}^{21}C_2-{}^{10}C_2+{}^{21}C_3-{}^{10}C_3+{}^{21}C_4-{}^{10}C_4+\ \ldots\ +{}^{21}C_{10}-{}^{10}C_{10}$ is

(A) $2^{21} - 2^{11}$
(B) $2^{21} - 2^{10}$
(C) $2^{20} - 2^{9}$
(D) $2^{20} - 2^{10}$

Answer: (D) $2^{20} - 2^{10}$ · Key from source paper

Q215 JEE Main 2016 · 10 Apr · Online MCQ

If the coefficients of x^{-2} and x^{-4}, in the expansion of $\left(x^{\frac{1}{3}} + \frac{1}{2x^{\frac{1}{3}}}\right)^{18}$, $(x > 0)$, are m and n respectively, then $\frac{m}{n}$ is equal to

(A) 27
(B) 182
(C) $\frac{5}{4}$
(D) $\frac{4}{5}$

Answer: (B) 182 · Key from source paper

Q216 JEE Main 2016 · 9 Apr · Online MCQ

For $x \in R,\ x \neq -1$, if $(1+x)^{2016} + x(1+x)^{2015} + x^2(1+x)^{2014} + \ldots + x^{2016} = \sum_{i=0}^{2016} a_i x_i$, then a_{17} is equal to

(A) $\frac{2017!}{17!\,2000!}$
(B) $\frac{2016!}{17!\,1999!}$
(C) $\frac{2016!}{16!}$
(D) $\frac{2017!}{2000!}$

Answer: (A) $\frac{2017!}{17!\,2000!}$ · Key from source paper

Q217 JEE Main 2016 · 3 Apr · Offline MCQ

If the number of terms in the expansion of $\left(1 - \frac{2}{x} + \frac{4}{y^2}\right)^n$, $x,\ y \neq 0$, is 28, then the sum of the coefficients of all the terms in this expansion is

(A) 243
(B) 729
(C) 64
(D) 2187

Answer: (B) 729 · Key from source paper

Q218 JEE Main 2015 · 11 Apr · Online MCQ

The term independent of x in the binomial expansion of $\left(1 - \frac{1}{x} + 3x^5\right)\left(2x^2 - \frac{1}{x}\right)^8$ is

(A) -496
(B) -400
(C) 496
(D) 400

Answer: (D) 400 · Key from source paper

Q219 JEE Main 2015 · 10 Apr · Online MCQ

If the coefficient of the three successive terms in the binomial expansion of $(1+x)^n$ are in the ratio 1 : 7 : 42, then the first of these terms in the expansion is

(A) 9th
(B) 6th
(C) 8th
(D) 7th

Answer: (D) 7th · Key from source paper

Q220 JEE Main 2015 · 4 Apr · Offline MCQ

The sum of coefficients of integral powers of x in the binomial expansion of $(1-2\sqrt{x})^{50}$ is

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

Answer: (B) $\frac{1}{2}\left(3^{50}+1\right)$ · Key from source paper

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Q221 JEE Main 2014 · 19 Apr · Online MCQ

The coefficient of x^{1012} in the expansion of $\left(1+x^n+x^{253}\right)^{10}$, (where $n \leq 22$ is any positive integer), is

(A) ${}^{253}C_4$
(B) ${}^{10}C_4$
(C) $4n$
(D) 1

Answer: (B) ${}^{10}C_4$ · Key from source paper

Q222 JEE Main 2014 · 12 Apr · Online MCQ

If $1+x^4+x^5=\sum_{i=0}^{5} a_i\left(1+x^i\right)$, for all x in R, then a_2 is:

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

Answer: (A) -4 · Key from source paper

Q223 JEE Main 2014 · 12 Apr · Online MCQ

If $\left(2+\frac{x}{3}\right)^{55}$ is expanded in the ascending powers of x and the coefficients of powers of x in two consecutive terms of the expansion are equal, then these terms are:

(A) 7th and 8th
(B) 8th and 9th
(C) 28th and 29th
(D) 27th and 28th

Answer: (B) 8th and 9th · Checked by our team

Q224 JEE Main 2014 · 11 Apr · Online MCQ

The coefficient of x^{50} in the binomial expansion of $(1+x)^{1000}+x(1+x)^{999}+x^2(1+x)^{998}+\ldots+x^{1000}$ is:

(A) $\frac{(1000)!}{(50)(!95\varphi!}$
(B) $\frac{(1000)!}{(49)(!95)!}$
(C) $\frac{(1001)!}{(51)(!95\phi!}$
(D) $\frac{(1001)!}{(50)(!95)!}$

Answer: (D) $\frac{(1001)!}{(50)(!95)!}$ · Key from source paper

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Q225 JEE Main 2014 · 9 Apr · Online MCQ

The number of terms in the expansion of $(1+x)^{101}\,(1-x+x^2)^{100}$ in powers of x is

(A) 301
(B) 302
(C) 101
(D) 202

Answer: (D) 202 · Key from source paper

Q226 JEE Main 2014 · 6 Apr · Offline MCQ

If the coefficients of x^3 and x^4 in the expansion of $(1+ax+bx^2)(1-2x)^{18}$ in powers of x are both zero, then (a,b) is equal to

(A) $(14, \frac{272}{3})$
(B) $(16, \frac{272}{3})$
(C) $(16, \frac{251}{3})$
(D) $(14, \frac{251}{3})$

Answer: (B) $(16, \frac{272}{3})$ · Key from source paper

Q227 JEE Main 2013 · 25 Apr · Online MCQ

If for positive integers $r > 1, n > 2$, the coefficients of the $(3r)^{\text{th}}$ and $(r+2)^{\text{th}}$ powers of x in the expansion of $(1+x)^{2n}$ are equal, then n is equal to:

(A) $2r+1$
(B) $2r-1$
(C) $3r$
(D) $r+1$

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

Q228 JEE Main 2013 · 23 Apr · Online MCQ

The sum of the rational terms in the binomial expansion of $\left(2^{\frac{1}{2}} + 3^{\frac{1}{5}}\right)^{10}$ is :

(A) 25
(B) 32
(C) 9
(D) 41

Answer: (D) 41 · Key from source paper

Q229 JEE Main 2013 · 22 Apr · Online MCQ

If the 7th term in the binomial expansion of $\left(\frac{3}{\sqrt[3]{84}} + \sqrt{3}\ln x\right)^9$, $x > 0$, is equal to 729 , then x can be:

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

Answer: (B) e · Key from source paper

Q230 JEE Main 2013 · 9 Apr · Online MCQ

The ratio of the coefficient of x^{15} to the term independent of x in the expansion of $\left(x^2 + \frac{2}{x}\right)^{15}$ is :

(A) 7 : 16
(B) 7 : 64
(C) 1 : 4
(D) 1 : 32

Answer: (D) 1 : 32 · Key from source paper

Q231 JEE Main 2013 · 7 Apr · Offline MCQ

The term independent of x in the expansion of $\left(\frac{x+1}{x^{2/3}-x^{1/3}+1}-\frac{x-1}{x-x^{1/2}}\right)^{10}$ is

(A) 210
(B) 310
(C) 4
(D) 120

Answer: (A) 210 · Key from source paper

Q232 AIEEE 2012 · 26 May · Online MCQ

The middle term in the expansion of $\left(1-\frac{1}{x}\right)^n(1-x^n)$ in powers of x is

(A) $-{}^{2n}C_{n-1}$
(B) $-{}^{2n}C_n$
(C) ${}^{2n}C_{n-1}$
(D) ${}^{2n}C_n$

Answer: (D) ${}^{2n}C_n$ · Key from source paper

Q233 AIEEE 2012 · 12 May · Online MCQ

The number of terms in the expansion of $\left(y^{1/5}+x^{1/10}\right)^{55}$, in which powers of x and y are free from radical signs are

(A) six
(B) twelve
(C) seven
(D) five

Answer: (A) six · Key from source paper

Q234 AIEEE 2012 · 7 May · Online MCQ

If $f(y)=1-(y-1)+(y-1)^2-(y-1)^3+\ldots-(y-1)^{17}$ then the coefficient of y^2 in it is

(A) ${}^{17}C_2$
(B) ${}^{17}C_3$
(C) ${}^{18}C_2$
(D) ${}^{18}C_3$

Answer: (D) ${}^{18}C_3$ · Key from source paper

Q235 AIEEE 2012 · Offline MCQ

If n is a positive integer, then $(\sqrt{3}+1)^{2n} - (\sqrt{3}-1)^{2n}$ is

(A) an irrational number
(B) an odd positive integer
(C) an even positive integer
(D) a rational number other than positive integers

Answer: (A) an irrational number · Key from source paper

Q236 AIEEE 2011 MCQ

The coefficient of x^7 in the expansion of $(1 - x - x^2 + x^3)^6$ is

(A) -132
(B) -144
(C) 132
(D) 144

Answer: (B) -144 · Key from source paper

Q237 AIEEE 2010 MCQ

Let $S_1 = \sum_{j=1}^{10} j(j-1)\,{}^{10}C_j$, $S_2 = \sum_{j=1}^{10} j\,{}^{10}C_j$ and $S_3 = \sum_{j=1}^{10} j^2\,{}^{10}C_j$. Statement-1: $S_3 = 55 \times 2^9$ Statement-2: $S_1 = 90 \times 2^8$ and $S_2 = 10 \times 2^8$.

(A) Statement-1 is true, Statement-2 is true; Statement-2 is not the correct explanation for Statement-1
(B) Statement-1 is true, Statement-2 is false
(C) Statement-1 is false, Statement-2 is true
(D) Statement-1 is true, Statement-2 is true; Statement-2 is the correct explanation for Statement-1

Answer: (B) Statement-1 is true, Statement-2 is false · Key from source paper

Q238 AIEEE 2009 MCQ

The remainder left out when $8^{2n} - (62)^{2n+1}$ is divided by 9 is

(A) 0
(B) 2
(C) 7
(D) 8

Answer: (B) 2 · Key from source paper

Q239 AIEEE 2008 MCQ

Statement-1: $\sum_{r=0}^{n}(r+1)\,{}^{n}C_r = (n+2)2^{n-1}$ Statement -2: $\sum_{r=0}^{n}(r+1)\,{}^{n}C_r x^r = (1+x)^n + nx(1+x)^{n-1}$.

(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

Q240 AIEEE 2007 MCQ

In the binomial expansion of $(a-b)^n, n \geq 5$, the sum of 5th and 6th terms is zero, then $\frac{a}{b}$ equals

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

Answer: (D) $\frac{n-4}{5}$ · Key from source paper

Q241 AIEEE 2007 MCQ

The sum of the series ${}^{20}\mathrm{C}_0 - {}^{20}\mathrm{C}_1 + {}^{20}\mathrm{C}_2 - {}^{20}\mathrm{C}_3 + \ldots - \ldots + {}^{20}\mathrm{C}_{10}$ is

(A) $-{}^{20}\mathrm{C}_{10}$
(B) $\frac{1}{2}\,{}^{20}\mathrm{C}_{10}$
(C) 0
(D) ${}^{20}\mathrm{C}_{10}$

Answer: (B) $\frac{1}{2}\,{}^{20}\mathrm{C}_{10}$ · Key from source paper

Q242 AIEEE 2006 MCQ

If the expansion in powers of x of the function $\frac{1}{(1-ax)(1-bx)}$ is $a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots$, then a_n is

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

Answer: (D) $\frac{b^{n+1}-a^{n+1}}{b-a}$ · Key from source paper

Q243 AIEEE 2006 MCQ

For natural numbers m, n if $(1-y)^m(1+y)^n = 1 + a_1y + a_2y^2 + \ldots$, and $a_1 = a_2 = 10$ then (m, n) is

(A) $(20, 45)$
(B) $(35, 20)$
(C) $(45, 35)$
(D) $(35, 45)$

Answer: (D) $(35, 45)$ · Key from source paper

Q244 AIEEE 2005 MCQ

If the coefficients of r th, $(r+1)$ th and $(r+2)$ th terms in the binomial expansion of $(1+y)^m$ are in A.P., then m and r satisfy the equation

(A) $m^2 - m(4r-1) + 4r^2 - 2 = 0$
(B) $m^2 - m(4r+1) + 4r^2 + 2 = 0$
(C) $m^2 - m(4r+1) + 4r^2 - 2 = 0$
(D) $m^2 - m(4r-1) + 4r^2 + 2 = 0$

Answer: (C) $m^2 - m(4r+1) + 4r^2 - 2 = 0$ · Key from source paper

Q245 AIEEE 2005 MCQ

If the coefficient of x^7 in $\left[ax^2 + \left(\frac{1}{bx}\right)\right]^{11}$ equals the coefficient of x^{-7} in $\left[ax - \left(\frac{1}{bx^2}\right)\right]^{11}$, then a and b satisfy the relation

(A) $a - b = 1$
(B) $a + b = 1$
(C) $\frac{a}{b} = 1$
(D) $ab = 1$

Answer: (D) $ab = 1$ · Key from source paper

Q246 AIEEE 2005 MCQ

If x is so small that x^3 and higher powers of x may be neglected, then $\frac{(1+x)^{3/2} - (1+\frac{1}{2}x)^3}{(1-x)^{1/2}}$

(A) $1-\frac{3}{8}x^2$
(B) $3x+\frac{3}{8}x^2$
(C) $-\frac{3}{8}x^2$
(D) $\frac{x}{2}-\frac{3}{8}x^2$

Answer: (C) $-\frac{3}{8}x^2$ · Key from source paper

Q247 AIEEE 2004 MCQ

The coefficient of the middle term in the binomial expansion in powers of x of $(1+\alpha x)^4$ and of $(1-\alpha x)^6$ is the same if α equals

(A) $-\frac{5}{3}$
(B) $\frac{3}{5}$
(C) $\frac{-3}{10}$
(D) $\frac{10}{3}$

Answer: (C) $\frac{-3}{10}$ · Key from source paper

Q248 AIEEE 2004 MCQ

The coefficient of x^n in expansion of $(1+x)(1-x)^n$ is

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

Answer: (B) $(-1)^n(1-n)$ · Key from source paper

Q249 AIEEE 2004 MCQ

If $S_n=\sum_{r=0}^{n}\frac{1}{{}^nC_r}$ and $t_n=\sum_{r=0}^{n}\frac{r}{{}^nC_r}$, then $\frac{t_n}{S_n}$ is equal to

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

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

Q250 AIEEE 2003 MCQ

If $f(x)=x^n$, then the value of $f(1)-\frac{f'(1)}{1}+\frac{f''(1)}{2!}-\frac{f'''(1)}{3!}+\ldots\ldots\ldots\ldots+\frac{(-1)^n f^{(n)}(1)}{n!}$ is

(A) 1
(B) 2^n
(C) $2^n - 1$
(D) 0

Answer: (D) 0 · Key from source paper

Q251 AIEEE 2003 MCQ

If x is positive, the first negative term in the expansion of $(1+x)^{27/5}$ is

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

Answer: (D) 8th term · Key from source paper

Q252 AIEEE 2003 MCQ

The number of integral terms in the expansion of $(\sqrt{3}+8\sqrt{5})^{256}$ is

(A) 35
(B) 32
(C) 33
(D) 34

Answer: (C) 33 · Key from source paper

Q253 AIEEE 2002 MCQ

The coefficients of x^p and x^q in the expansion of $(1+x)^{p+q}$ are

(A) equal
(B) equal with opposite signs
(C) reciprocals of each other
(D) none of these

Answer: (A) equal · Key from source paper

Q254 AIEEE 2002 MCQ

If the sum of the coefficients in the expansion of $(a+b)^n$ is 4096 , then the greatest coefficient in the expansion is

(A) 1594
(B) 792
(C) 924
(D) 2924

Answer: (C) 924 · Key from source paper

Q255 AIEEE 2002 MCQ

The positive integer just greater than $(1+0.0001)^{10000}$ is

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

Answer: (D) 3 · Checked by our team

Q256 AIEEE 2002 MCQ

r and n are positive integers $r>1, n>2$ and coefficient of $(r+2)^{\text{th}}$ term and $3r^{\text{th}}$ term in the expansion of $(1+x)^{2n}$ are equal, then n equals

(A) 3r
(B) 3r + 1
(C) 2r
(D) 2r + 1

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

EdLoop JEE