

Tarun Classes of Mathematics

IIT-JEE Mains | CBSE | PU-CET | NDA

Talwara Township, Hoshiarpur | +91 9463672753 | tarunclasses.in

Binomial Theorem

Subjects : Maths

Previous Year Questions

Maths - Section A (MCQ.)

1. If for $3 \leq r \leq 30$, $\binom{30}{30-r} + 3\binom{30}{31-r} + 3\binom{30}{32-r} + \binom{30}{33-r} = \binom{m}{r}$, then m equals:
A) 31 B) 32 C) 33 D) 34
2. Let the smallest value of $k \in \mathbb{N}$, for which the coefficient of x^3 in $(1+x)^3 + (1+x)^4 + (1+x)^5 + \dots + (1+x)^{99} + (1+kx)^{100}$, $x \neq 0$, is $\left(43n + \frac{101}{4}\right) \binom{100}{3}$ for some $n \in \mathbb{N}$, be p . Then the value of $p+n$ is:
A) 10 B) 11 C) 12 D) 13
3. 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
4. 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 _____.
A) 21 B) 22 C) 23 D) 24
5. 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
6. 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) $\frac{7}{27}$
7. 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 _____.
A) 30 B) 40 C) 50 D) 60
8. If $26 \left(\frac{2^3}{3} \binom{12}{2} + \frac{2^5}{5} \binom{12}{4} + \frac{2^7}{7} \binom{12}{6} + \dots + \frac{2^{13}}{13} \binom{12}{12} \right) = 3^{13} - \alpha$, then α is equal to:
A) 45 B) 48 C) 51 D) 54
9. The sum of the coefficients of x^{499} and x^{500} in $(1+x)^{1000} + x(1+x)^{999} + x^2(1+x)^{998} + \dots + x^{1000}$ is
A) $^{1001}C_{501}$ B) $^{1002}C_{500}$
C) $^{1002}C_{501}$ D) $^{1000}C_{501}$
10. Let $S = \frac{1}{25!} + \frac{1}{3!23!} + \frac{1}{5!21!} + \dots$ up to 13 terms. If $13S = \frac{2^k}{n!}$ where $k \in \mathbb{N}$, then $n+k$ is equal to
A) 51 B) 52 C) 49 D) 50

11. The sum of all possible values of $n \in \mathbb{N}$ 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) 3 B) 7 C) 12 D) 9
12. 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
13. The remainder when $((64)^{(64)})^{(64)}$ is divided by 7 is equal to
- A) 4 B) 1 C) 3 D) 6
14. The remainder, when 7^{103} is divided by 23, is equal to :
- A) 6 B) 17 C) 9 D) 14
15. If $1^2 \cdot ({}^{15}C_1) + 2^2 \cdot ({}^{15}C_2) + 3^2 \cdot ({}^{15}C_3) + \dots + 15^2 \cdot ({}^{15}C_{15}) = 2^m \cdot 3^n \cdot 5^k$, where $m, n, k \in \mathbb{N}$, then $m + n + k$ is equal to :
- A) 19 B) 21 C) 18 D) 20
16. If $\sum_{r=1}^9 \left(\frac{r+3}{2^r}\right) \cdot {}^9C_r = \alpha \left(\frac{3}{2}\right)^9 - \beta$, $\alpha, \beta \in \mathbb{N}$, then $(\alpha + \beta)^2$ is equal to
- A) 27 B) 9 C) 81 D) 18
17. 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) 15 B) 11 C) 24 D) 20
18. The number of integral terms in the expansion of $\left(5^{\frac{1}{2}} + 7^{\frac{1}{8}}\right)^{1016}$ is
- A) 127 B) 130 C) 129 D) 128
19. 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 nC_3 is:
- A) 4060 B) 1040 C) 2300 D) 4960
20. The term independent of x in the expansion of $\left(\frac{(x+1)}{(x^{\frac{2}{3}}+1-x^{\frac{1}{3}})} - \frac{(x+1)}{(x-x^{\frac{1}{2}})}\right)^{10}$, $x > 1$ is:
- A) 210 B) 150 C) 240 D) 120
21. The least value of n for which the number of integral terms in the Binomial expansion of $(\sqrt[3]{7} + \sqrt[12]{11})^n$ is 183, is :
- A) 2184 B) 2196 C) 2148 D) 2172
22. 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 $(\sqrt[3]{3} + \sqrt[3]{4})^{12}$. Then $p + q$ is equal to :
- A) 283 B) 287 C) 295 D) 299
23. 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
24. For some $n \neq 10$, let the coefficients of the 5th, 6th and 7th 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
25. The sum of all rational terms in the expansion of $(2 + \sqrt{3})^8$ is

A) 16923

B) 3763

C) 33845

D) 18817

26. 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
27. Let α, β, γ and δ be the coefficients of x^7, x^5, x^3 and x respectively in the expansion of $(x + \sqrt{x^3 - 1})^5 + (x - \sqrt{x^3 - 1})^5, x > 1$. If u and v satisfy the equations
 $\alpha u + \beta v = 18$
 $\gamma u + \delta v = 20$
then $u + v$ equals :
- A) 5 B) 3 C) 4 D) 8
28. The sum of the coefficient of $x^{2/3}$ and $x^{-2/5}$ in the binomial expansion of $(x^{2/3} + \frac{1}{2}x^{-2/5})^9$ is :
- A) $21/4$ B) $69/16$ C) $63/16$ D) $19/4$
29. The coefficient of x^{70} in $x^2(1+x)^{98} + x^3(1+x)^{97} + x^4(1+x)^{96} + \dots + x^{54}(1+x)^{46}$ is ${}^{99}C_p - {}^{46}C_q$. Then a possible value to $p + q$ is :
- A) 55 B) 61 C) 68 D) 83
30. If the second, third and fourth terms in the expansion of $(x+y)^n$ are 135, 30 and $\frac{10}{3}$, respectively, then $6(n^3 + x^2 + y)$ is equal to
- A) 305 B) 806 C) 604 D) 204
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- Maths - Section B (Numeric)**
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31. The product of the last two digits of $(1919)^{1919}$ is _____.
32. Let $S = \{(m, n) : m, n \in \{1, 2, 3, \dots, 50\}\}$. If the number of elements (m, n) in S such that $6^m + 9^n$ is a multiple of 5 is p and the number of elements (m, n) in S such that $m + n$ is a square of a prime number is q , then $p + q$ is equal to :
33. If $(\frac{1}{{}^{15}C_0} + \frac{1}{{}^{15}C_1})(\frac{1}{{}^{15}C_1} + \frac{1}{{}^{15}C_2}) \dots (\frac{1}{{}^{15}C_{12}} + \frac{1}{{}^{15}C_{13}}) = \frac{a^{13}}{{}^{14}C_0 {}^{14}C_1 \dots {}^{14}C_{12}}$ then $30a$ is equal to :
34. The sum of all rational terms in the expansion of $(1 + 2^{1/3} + 3^{1/2})^6$ is equal to
35. The sum of the series $2 \times 1 \times {}^{20}C_4 - 3 \times 2 \times {}^{20}C_5 + 4 \times 3 \times {}^{20}C_6 - 5 \times 4 \times {}^{20}C_7 + \dots + 18 \times 17 \times {}^{20}C_{20}$, is equal to
36. Let $(1+x+x^2)^{10} = a_0 + a_1x + a_2x^2 + \dots + a_{20}x^{20}$. If $(a_1 + a_3 + a_5 + \dots + a_{19}) - 11a_2 = 121k$, then k is equal to _____.
37. If $\sum_{r=1}^{30} \frac{r^2({}^{30}C_r)^2}{{}^{30}C_{r-1}} = \alpha \times 2^{29}$, then α is equal to _____
38. 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 _____
39. 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 _____.
40. The remainder when 428^{2024} is divided by 21 is

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Previous Year Questions

Maths - Section A (MCQ.)

1 - C	2 - B	3 - A	4 - A	5 - B	6 - D	7 - A	8 - C	9 - B	10 - C
11 - D	12 - C	13 - B	14 - D	15 - A	16 - C	17 - D	18 - D	19 - C	20 - A
21 - A	22 - A	23 - C	24 - C	25 - D	26 - B	27 - A	28 - A	29 - D	30 - B

Maths - Section B (Numeric)

31 - 63	32 - 1333	33 - 32	34 - 612	35 - 34	36 - 239	37 - 465	38 - 2035	39 - 5	40 - 1
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