



India's Number 1 Education App

MATHS

BOOKS - DISHA PUBLICATION MATHS (HINGLISH)

BINOMIAL THEOREM

Jee Main 5 Years At A Glance

1. The sum of the coefficients of all odd degree terms in the expansion of

$$\left(x + \sqrt{x^3 - 1}\right)^5 + \left(x - \sqrt{x^3 - 1}\right)^5, (x > 1) \text{ is :}$$

A. 0

B. 1

C. 2

D. -1

Answer: C



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

A. 106

B. 107

C. 155

D. 108

Answer: A



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3. The value of $(.^{21} C_1 - .^{10} C_1) + (.^{21} C_2 - .^{10} C_2) + (.^{21} C_3 - .^{10} C_3) + (.^{21} C_4 - .^{10} C_4)$ is

A. $2^{20} - 2^{10}$

B. $2^{21} - 2^{11}$

C. $2^{21} - 2^{10}$

D. $2^{20} - 2^9$

Answer: A



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

A. 1

B. 2

C. 3

D. 6

Answer: D



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5. If the number of terms in the expansion of $\left(1 - \frac{2}{x} + \frac{4}{x^2}\right)^n$, $x \neq 0$, is 28, then the sum of the coefficients of all the terms in this expansion, is : (1) 64 (2) 2187 (3) 243 (4) 729

A. 243

B. 729

C. 64

D. 2187

Answer: B



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6. The sum of coefficients of integral powers of x in the binomial expansion of $(1 - 2\sqrt{x})^{50}$ is: (1) $\frac{1}{2}(3^{50} + 1)$ (2) $\frac{1}{2}(3^{50})$ (3) $\frac{1}{2}(3^{50} - 1)$ (4) $\frac{1}{2}(2^{50} + 1)$

A. $\frac{1}{2}(3^{50} - 1)$

B. $\frac{1}{2}(2^{50} + 1)$

C. $\frac{1}{2}(3^{50} + 1)$

D. $\frac{1}{2}(3^{50})$

Answer: C



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7. If the coefficients 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. 8th

B. 6th

C. 7th

D. 9th

Answer: C



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8. 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 (1) $\left(16, \frac{251}{3}\right)$ (3) $\left(14, \frac{251}{3}\right)$ (2) $\left(14, \frac{272}{3}\right)$ (4) $\left(16, \frac{272}{3}\right)$

A. $\left(14, \frac{272}{3}\right)$

B. $\left(16, \frac{272}{3}\right)$

C. $\left(16, \frac{251}{3}\right)$

D. $\left(14, \frac{251}{3}\right)$

Answer: B



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9. If $X = \{4^n - 3n - 1 : n \in N\}$ and $Y = \{9(n - 1) : n \in N\}$, where N is the set of natural numbers, then $X \cup Y$ is equal to (1) N (2) $Y - X$ (3) X (4)

Y

A. X

B. Y

C. N

D. Y-X

Answer: B



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

A. 302

B. 301

C. 202

D. 101

Answer: C



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Exercise 1 Concept Builder

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

A. $(-1)^{n-1}n$

B. $(-1)^n(1-n)$

C. $(-1)^{n-1}(n-1)^2$

D. $(n-1)$

Answer: B



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2. If p and q are positive, then prove that the coefficients of x^p and x^q in the expansion of $(1 + x)^{p+q}$ will be equal.

- A. equal
- B. equal with opposite signs
- C. reciprocal of each other
- D. None of these

Answer: A



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3. After simplification, what is the number of terms in the expansion of $\left[(3x + y)^5\right]^4 - \left[(3x - y)^4\right]^5$?

- A. 4
- B. 5

C. 10

D. 11

Answer: C



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4. If $x = (2 + \sqrt{3})^n$, then find the value of $x(1 - \{x\})$, where $\{x\}$ denotes the fractional part of x

A. 1

B. 2

C. 2^{2n}

D. 2^n

Answer: A



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5. Prove that $(n!)$ is divisible by $(n!)^{n-1}!$

A. $(n - 1)!^{(n-1)}$!

B. $(n - 1)^{n!}$

C. $n!^n$!

D. None of these

Answer: A



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6. If $x + y = 1$, then $\sum_{r=0}^n rnC_r x^r y^{n-r}$ equals

A. 1

B. n

C. nx

D. ny

Answer: C



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7. The coefficient of x^3 in the expansion of $\frac{3 - 2x}{(1 + 3x)^3}$ is

A. - 272

B. - 540

C. - 870

D. - 918

Answer: D



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8. The number of dissimilar terms in the expansion of $(a + b)^n$ is $n + 1$, therefore number of dissimilar terms in the expansion of $(a + b + c)^{12}$ is

A. 13

B. 39

C. 78

D. 91

Answer: D



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9. Let $a = 3^{\frac{1}{223}} + 1$ and for all

≥ 3 , let $f(n) = {}^n C_0 \dot{a}^{n-1} - {}^n C_1 \dot{a}^{n-2} + {}^n C_2 \dot{a}^{n-3} - \dots + (-1)^{n-1} \dot{a}^0 n C_{n-1}$

. If the value of $f(2007) + f(2008) = 3^k$ where $k \in N$, then the value of k is.

A. 2187

B. 1987

C. 3232

D. 4187

Answer: A



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10. If $\sum_{r=0}^{10} \left(\frac{r+2}{r+1} \right) \wedge nC_r = \frac{2^8 - 1}{6}$, then n is 8 b. 4 c. 6 d. 5

A. 8

B. 4

C. 6

D. 5

Answer: D



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11. The total number of terms in the expansion of $(x + a)^{51} - (x - a)^{51}$ after simplification is

A. 102

B. 25

C. 26

D. None of these

Answer: C



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12. If $|x| < 1$ then

$$1 + n \left(\frac{2x}{1+x} \right) + \frac{n(n+1)}{2!} \left(\frac{2x}{1+x} \right)^2 + \dots \dots \infty =$$

A. $\left(\frac{2x}{1+x} \right)^n$

B. $\left(\frac{1+x}{2x} \right)^n$

C. $\left(\frac{1-x}{1+x} \right)^n$

D. $\left(\frac{1+x}{1-x} \right)^n$

Answer: D



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13. When 2^{1505} is divided by 9, the remainder is

A. 8

B. 7

C. 5

D. 6

Answer: C



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14. The minimum positive integral value of m such that $(1073)^{71} - m$ may be divisible by 10, is

A. 1

B. 3

C. 7

D. 9

Answer: C



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15. If n is a positive integer and $C_k = {}^nC_k$, then the value of

$$\sum_{k=1}^n k^3 \left(\frac{C_k}{C_{k-1}} \right)^2 \text{ is :}$$

A. $\frac{n(n+1)(n+2)}{12}$

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

C. $\frac{n(n+1)^2(n+2)}{6}$

D. None of these

Answer: B



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16. If three consecutive coefficients in the expansion of $(1 + x)^n$ are in the ratio 6:33:110, find n and r.

A. 9

B. 6

C. 12

D. 16

Answer: C



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17. If I is integral part of $(2 + \sqrt{3})^n$ and f is its fractional part. Then

$(I + f)(1 - f)$ is:

A. $I + 1$

B. 1

C. n

D. 2^n

Answer: B



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18. The greatest integer less than or equal to $(\sqrt{2} + 1)^6$ is

A. 196

B. 197

C. 198

D. 199

Answer: B



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19. Find the number of nonzero terms in the expansion of

$$(1 + 3\sqrt{2}x)^9 + (1 - 3\sqrt{2}x)^9.$$

A. 2

B. 3

C. 4

D. 5

Answer: D



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20. If $(+x)^n = \sum_{r=0}^n a_r x^r \& b_r = 1 + \frac{a_r}{a_{r-1}} \& \prod_{r=1}^n b_r = \frac{(101)^{100}}{100!}$, then

equals to: 99 (b) 100 (c) 101 (d) None of these

A. 99

B. 100

C. 101

D. None of these

Answer: B



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21. The expression $\frac{1}{\sqrt{3x+1}} \left[\left(\frac{1+\sqrt{3x+1}}{2} \right)^7 - \left(\frac{1-\sqrt{3x+1}}{2} \right)^7 \right]$

is a polynomial in x of degree equal to

A. 3

B. 4

C. 2

D. 5

Answer: A



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22. If $z = \frac{1}{3} + \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + \dots$ then

A. x

B. $(1+x)^{1/3}$

C. $(1-x)^{1/3}$

D. $(1-x)^{-1/3}$

Answer: D



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23. If the sum of the coefficients in the expansion of

$(1+2x)^n$ is 6561, the greatest term in the expansion for $x = 1/2$, is

A. 4th

B. 5th

C. 6th

D. None of these

Answer: B



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24. The coefficient of 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 210 b. 105 c. 70 d. 112

A. 210

B. 105

C. 70

D. 112

Answer: A



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25. If the coefficient of $(r+1)^{th}$ term in the expansion of

$(1+x)^{2n}$ be equal to that of $(r+3)^{th}$ term , then

A. $\frac{x^r}{r!}$

B. $\frac{(r+1)(r+2)(r+3)}{6}$

C. $\frac{(r+2)(r+3)}{2}x^r$

D. None of these

Answer: B



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

A. $\frac{n-5}{6}$

B. $\frac{n-4}{5}$

C. $\frac{5}{n-4}$

D. $\frac{6}{n-5}$

Answer: B



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27. If r^{th} term in the expansion of $\left(\frac{x}{3} - \frac{2}{x^2}\right)^{10}$ contains x^4 , then find the value of r

A. 1

B. 2

C. 3

D. 4

Answer: B



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28. If t_1 is the r^{th} term in the expansion of $(1 + x)^{101}$, then what is the ratio $\frac{t_{20}}{t_{19}}$ equal to ?

A. $\frac{20x}{19}$

B. $83x$

C. $19x$

D. $\frac{83x}{19}$

Answer: D



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29. The middle term in the expansion of $\left(1 + \frac{1}{x^2}\right)^n (1 + x^2)^n$ is

A. ${}^{2n}C_n x^{2n}$

B. ${}^{2n}C_n x^{-2n}$

C. ${}^{2n}C_n$

D. ${}^{2n}C_{n-1}$

Answer: C



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30. If three consecutive coefficients in the expansion of $(1 + x)^n$ are in the ratio 6:33:110, find n and r.

A. 9

B. 6

C. 12

D. 16

Answer: C



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31. If the middle term in the expansion of $(x^2 + 1/x)^n$ is $924x^6$, then find the value of n.

A. 10

B. 11

C. 12

D. 13

Answer: C



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32. If the middle term in the expansion of $\left(\frac{1}{x} + x \sin x\right)^{10}$ is equal to $7\frac{7}{8}$, then the number of values of x in $[0, 2\pi]$ is equal to

A. $2n\pi \pm \frac{\pi}{6}$

B. $n\pi + \frac{\pi}{6}$

C. $n\pi + (-1)^n \frac{\pi}{6}$

D. $n\pi + (-1)^n \frac{5\pi}{6}$

Answer: C



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33. Third term in expression of $(x + x^{\log_{10} x})^5$ is 10^6 than possible value of x are

- A. 1
- B. $\sqrt{10}$
- C. 10
- D. $10^{-2/5}$

Answer: C



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34. If x is positive, the first negative term in the expansion of $(1 + x)^{27/5}$ is (| x | < 1) 5th term b. 8th term c. 6th term d. 7th term

- A. 6th term
- B. 7th term
- C. 5th term

D. 8th term

Answer: D



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35. What is the coefficient of x^3y^4 in $(2x + 3y^2)^5$?

A. 240

B. 360

C. 720

D. 1080

Answer: C



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36. If the fourth term in the expansion of $\left(ax + \frac{1}{x}\right)^n$ is $\frac{5}{2}$, then find the values of a and n .

A. 2

B. 6

C. 3

D. 4

Answer: C



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37. The number of real negative terms in the binomial expansion of $(1 + ix)^{4n-2}$, $n \in N$, $n > 0$, $I = \sqrt{-1}$, is

A. n

B. $n + 1$

C. $n - 1$

D. 2n

Answer: A



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38. The number of integral terms in the expansion of $(\sqrt{3} - \sqrt[8]{5})^{256}$ is

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

A. 35

B. 32

C. 33

D. 34

Answer: C



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39. Prove by induction that the integer next greater than $(3 + \sqrt{5})^n$ is divisible by 2^n for all $n \in N$.

A. 2^{n-1}

B. 2^{n+1}

C. 2^{n+2}

D. not divisible by 2

Answer: B



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40. The value of x in the expression $\left(x + x^{(\log)_{10}}\right)^5$ if third term in the expansion is 10,00,000 is/are a. 10 b. 100 c. $10^{-5/2}$ d. $10^{-3/2}$

A. 10, $10^{-3/2}$

B. 100 or $10^{-3/2}$

C. 10 or $10^{-5/2}$

D. None of these

Answer: C



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41. If the 6th term in the expansion of $\left[\frac{1}{x^{\frac{8}{3}}} + x^2 \log_{10} x \right]^8$ is 5600, then x

=

A. 10

B. 1

C. 100

D. None of these

Answer: A



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42. 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



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43. If the 7th term in the binomial expansion of $\left(\frac{3}{(84)^{\frac{1}{3}}} + \sqrt{3} \ln x\right)^9$, $x > 0$ is equal to 729 then x can be (A) e^2 (B) e (C) $\frac{e}{2}$ (D) $2e$

A. e^2

B. e

C. $\frac{e}{2}$

D. $2e$

Answer: B



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44. The sum of the coefficients in the expansion of

$$\left(x^2 - \frac{1}{3}\right)^{199} \times \left(x^3 + \frac{1}{2}\right)^{200} \text{ is}$$

A. $1/3$

B. $-1/3$

C. $2/3$

D. $3/2$

Answer: D



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45. The value of
 $.^{20}C_{10} + .^{20}C_1 + .^{20}C_2 + .^{20}C_3 + .^{20}C_4 + .^{20}C_{12} + .^{20}C_{13} + .^{20}C_{14} + .^{20}C_9$
is

- A. $2^{19} - \frac{(^{20}C_{10} + ^{20}C_9)}{2}$
- B. $2^{19} - \frac{(^{20}C_{10} + 2 \times ^{20}C_9)}{2}$
- C. $2^{19} - \frac{^{20}C_{10}}{2}$
- D. None of these

Answer: B



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

A. $a-b=1$

B. $a+b=1$

C. $\frac{a}{b} = 1$

D. $ab = 1$

Answer: D



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47. The sum of the series

$$C20(0) - C20(1) + C20(2) - C20(3) + \dots - \dots + C20(10) \quad \text{is:} \quad (1)$$

$$- C20(10) \quad (2) \quad \frac{1}{2} C20(10) \quad (3) \quad 0 \quad (4) \quad C20(10)$$

A. 0

B. ${}^{20}C_{10}$

C. $- {}^{20}C_{10}$

D. $\frac{1}{2} {}^{20}C_{10}$

Answer: D



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48. The sum of the series $\frac{12}{2!} + \frac{28}{3!} + \frac{50}{4!} + \frac{78}{5!} + \dots$ is

A. equal

B. $3e$

C. $4e$

D. $5e$

Answer: D



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49. The coefficient of x^{53} in the expansion

$\sum_{m=0}^{100} {}^{\wedge}(100)C_m(x-3)^{100-m}2^m$ is

b. ${}^{\wedge}100C_{47}$

c. ${}^{\wedge}100C_{53}$

d. $-{}^{100}C_{53}$

none of these

A. ${}^{100}C_{47}$

B. ${}^{100}C_{53}$

C. $-{}^{100}C_{53}$

D. $-{}^{100}C_{100}$

Answer: C



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50. 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



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51. $\frac{C_0}{1} + \frac{C_2}{3} + \frac{C_4}{5} + \frac{C_6}{7} + \dots =$

A. $\frac{2^{n+1}}{n+1}$

B. $\frac{2^{n+1} - 1}{n+1}$

C. $\frac{2^n}{n+1}$

D. None of these

Answer: C



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52. Consider the expansion of $(1+x)^{2n+1}$

If the coefficients of x^r and x^{r+1} are equal in the expansion, then r is equal to

A. 9

B. 10

C. 11

D. 12

Answer: B



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53. The value of ${}^{50}C_4 + \sum_{r=1}^6 {}^{56-r}C_3$, is

A. ${}^{55}C_4$

B. ${}^{55}C_3$

C. ${}^{56}C_3$

D. ${}^{56}C_4$

Answer: D



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54. If x is very small in magnitude compared with a

such that $\left(\frac{a}{a+x}\right)^{1/2} + \left(\frac{a}{a-x}\right)^{1/2} = 2 + k\frac{x^2}{a^2}$, then the value of k , is

A. $1 + \frac{1}{2} \frac{x}{a}$

B. $\frac{x}{a}$

C. $1 + \frac{3}{2} \frac{x^2}{a^2}$

D. $2 + \frac{3}{4} \frac{x^2}{a^2}$

Answer: D



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55. In the expression $(x+1)(x+4)(x+9)(x+16)\dots\dots(x+400)$, the coefficient of x^{19} is

A. 2870

B. 2100

C. 4001

D. 1900

Answer: A



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$$56. \frac{C_1}{C_0} + \frac{2 \cdot C_2}{C_1} + \frac{3 \cdot C_3}{C_2} + \dots + \frac{20 \cdot C_{20}}{C_{19}} =$$

A. 60

B. 120

C. 64

D. 124

Answer: B



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57. Given positive integers $r > 1$, $n > 2$ and that the coefficient of $(3rd)th$ and $(r + 2)th$ terms in the binomial expansion of $(1 + x)^{2n}$ are equal. Then n = 2r b. n = 2r + 1 c. n = 3r d. none of these

A. n = 2r

B. n = 3 r

C. $n = 2r + 1$

D. None of these

Answer: A



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58. The value of $\sum_{r=0}^n \sum_{s=1}^n .^n C_5 .^s C_r$ is

A. $(3^n - 1)$

B. $3^n - 1$

C. 3^n

D. $3(3^n - 1)$

Answer: A



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59. Find the value of $.^n C_r + .^{n-1} C_r + \dots + .^r C_r$

A. $.^n C_{r+1}$

B. $.^{n+1} C_r$

C. $.^{n+1} C_{r+1}$

D. None of these

Answer: C



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60. If $x^2y = 2x - y$ and $|x| < 1$, then

$$\frac{\left(y + \frac{y^3}{3} + \frac{y^5}{5} + \dots \infty\right)}{\left(x + \frac{x^3}{3} + \frac{x^5}{5} + \dots \infty\right)} =$$

A. If $y + \frac{y^3}{3} + \frac{y^5}{5} + \dots \infty = 2\left(x + \frac{x^3}{3} + \frac{x^5}{5} + \dots \infty\right)$ then

$$y = 2x^2 - x$$

B. $\left(\frac{a-b}{a}\right) + \frac{1}{2}\left(\frac{a-b}{a}\right)^2 + \frac{1}{3}\left(\frac{a-b}{a}\right)^3 + \dots \infty = \log ab$

C. $\frac{1}{2}x^2 + \frac{2}{3}x^3 + \frac{3}{4}x^4 + \dots \infty = \frac{x}{1-x} + \log(1-x)$

D. $\log_4 2 - \log_8 2 + \log_{16} 2 - \dots \infty = -\log 2$

Answer: C



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Exercise 2 Concept Applicator

1. If $a_n = (\log_e 3)^n \sum_{k=1}^{k^2} \frac{1}{k!(n-k)!}$ then $a_1 + a_2 + a_3 + \dots \infty$ is equal to

A. $3 \log_e 9$

B. $9 \log_e 3$

C. $9 \log_e 3(\log_e 3 + 1)$

D. $(\log_e 9)^2$

Answer: C



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2. The greatest term in the expansion of $(3 + 2x)^{51}$, where $x = \frac{1}{5}$, is

A. Only I

B. Only II

C. Both I and IV

D. Both III and IV

Answer: D



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3. The expansion of $\frac{1}{(4 - 3x)^{\frac{1}{2}}}$ by binomial theorem will be valid, if

- A. $x < 1$
- B. $|x| < 1$
- C. $-\frac{2}{\sqrt{3}} < x < \frac{2}{\sqrt{3}}$
- D. None of these

Answer: D



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4. The value of $\left\{ \frac{3^{2003}}{28} \right\}$ is

- A. $\frac{15}{28}$
- B. $\frac{5}{28}$
- C. $\frac{19}{28}$

D. $\frac{9}{28}$

Answer: C



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5. In the binomial expansion $(a + bx)^{-3} = \frac{1}{8} + \frac{9}{8}x + \dots$, then

the value of a and b are :

A. a=2,b =3

B. a=2,b = -6

C. a=3,b =2

D. a= -3, b = 2

Answer: B



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6. What is the last digit of $3^{3^{4n}} + 1$, where n is a natural number?

A. 0

B. 4

C. 8

D. 2

Answer: B



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7. Find the coefficient of x^5 in $(1 + 2x + 3x^2 \dots \dots \dots)^{-\frac{3}{2}}$

A. 15

B. 21

C. 12

D. 30

Answer: B



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8. If $f(x) = (x - 1)(x - 2)(x - 3) \dots (x - 50)$ find coeff. of x^{50} and x^{49}

A. - 2250

B. - 1275

C. 1275

D. 2250

Answer: B



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9. If n is a positive integer, then $(\sqrt{3} + i)^n + (\sqrt{3} - i)^n$ is

A. a non-real number

B. a real number

C. a positive real number

D. None of these

Answer: B



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10.

Prove

that

$$(C_0 + C_1)(C_1 + C_2)(C_2 + C_3)(C_{n-1} + C_n) = \frac{(n+1)^n}{n!} \cdot c_0, C_1, C_2, \dots$$

.

A. $\frac{(n+1)^n}{n!}$

B. $\frac{n^n}{(n-1)!}$

C. $\frac{(n+1)^n}{(n-1)!}$

D. None of these

Answer: A



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11. If $(1 + ax)^n = 1 + 8x + 24x^2 + \dots$. then the value of a and n is

A. n =4, a =2

B. n = 5, a =1

C. n=8,a=3

D. n=8,a=2

Answer: A



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12. The sum of the series

$$\frac{2}{1!} + \frac{4}{3!} + \frac{6}{5!} + \dots \text{ to } \infty \text{ equals}$$

- A. $\frac{2}{1!} + \frac{4}{3!} + \frac{6}{5!} + \dots\dots\infty = e$
- B. $\frac{\frac{2}{1!} + \frac{4}{3!} + \frac{6}{5!} + \dots\dots\infty}{\frac{1}{1!} + \frac{1}{3!} + \frac{1}{5!} + \dots\dots\infty} = \frac{e - 1}{e + 1}$
- C. $2 \sum_{n=2}^{\infty} {}^nC_2 = \frac{3^{n-2}}{n!} = e^3$
- D. $\sum_{n=2}^{\infty} \frac{{}^nC_2}{(n+1)!} = e - 2$

Answer: D



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13. If coefficient of $a^2b^3c^4 \in (a+b+c)^m$ (where $m \in N$) is L ($L \neq 0$) ,
then in same expansion coefficient of $a^4b^4c^1$ will be L b. $\frac{L}{3}$ c. $\frac{mL}{4}$ d. $\frac{L}{2}$

A. L

B. $\frac{L}{3}$

C. $\frac{mL}{4}$

D. $\frac{L}{2}$

Answer: D



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14. The number of dissimilar terms in the expansion of $(a + b)^n$ is $n + 1$, therefore number of dissimilar terms in the expansion of $(a + b + c)^{12}$ is

A. 13

B. 39

C. 78

D. 91

Answer: D



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15. The sum of rational term in $(\sqrt{2} + 33 + 56)^{10}$ is equal to 12632 b.

1260 c. 126 d. none of these

A. 12632

B. 1260

C. 126

D. 1262

Answer: A



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16. If the 7th term in the binomial expansion of

$$\left(\frac{3}{(84)^{\frac{1}{3}}} + \sqrt{3} \ln x \right)^9, x > 0$$
 is equal to 729 then x can be (A) e^2 (B) e (C) $\frac{e}{2}$ (D) $2e$

A. e^2

B. e

C. $\frac{e}{2}$

D. $2e$

Answer: B



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17. If $(+x)^n = \sum_{r=0}^n a_r x^r \& b_r = 1 + \frac{a_r}{a_{r-1}} \& \prod_{r=1}^n b_r = \frac{(101)^{100}}{100!}$, then

equals to: 99 (b) 100 (c) 101 (d) None of these

A. $\frac{(100)^{101}}{101!}$

B. $\frac{(101)^{100}}{100!}$

C. $\frac{(101)^{100}}{101!}$

D. None of these

Answer: B



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18. The coefficients of x^{13} in the expansion of

$(1-x)^5(1+x+x^2+x^3)^4$, is

A. 4

B. 6

C. 32

D. 5

Answer: A



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19. If x is so small that x^3 and higher powers of x may be neglected, then

$$\frac{(1+x)^{3/2} - \left(1 + \frac{1}{2}x\right)^3}{(1-x)^{1/2}} \text{ may be approximated as } 3x + \frac{3}{8}x^2 \text{ b.}$$
$$1 - \frac{3}{8}x^2 \text{ c. } \frac{x}{2} - \frac{3}{8}x^2 \text{ d. } -\frac{3}{8}x^2$$

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



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20. If $(r + 1)^{th}$ term is $\frac{3.5\dots(2r - 1)}{r!} \left(\frac{1}{5}\right)^r$, then this is the term of binomial expansion-

- A. $\left(1 - \frac{2}{5}\right)^{1/2}$
- B. $\left(1 - \frac{2}{5}\right)^{-1/2}$
- C. $\left(1 + \frac{2}{5}\right)^{-1/2}$
- D. $\left(1 + \frac{2}{5}\right)^{1/2}$

Answer: B



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21. The the term independent in the expansion of $\left[(t^{-1} - 1)x + (t^{-1} + 1)^{-1}x^{-1}\right]^8$ is

- A. $56\left(\frac{1-t}{1+t}\right)^3$

B. $56\left(\frac{1+t}{1-t}\right)^3$

C. $70\left(\frac{1-t}{1+t}\right)^4$

D. $70\left(\frac{1+t}{1-t}\right)^4$

Answer: C



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22. If the third in the expansion of $[x + x^{\log_{10}x}]^6$ is 10^6 , then x (gt 1) may be

A. 1

B. $\sqrt{10}$

C. 10

D. $10^{-2/5}$

Answer: C



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23. For what value of x is the ninth term in the expansion of $\left(3^{\log_3 \sqrt{25^{x-1} + 7}} + 3^{-\frac{1}{8}\log_3(5^{x-1} + 1)}\right)^{10}$ is equal to 180

- A. a prime number
- B. a natural number
- C. has non-zero fractional part
- D. None of these

Answer: B



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24. The middle term in the expansion of $\left(1 + \frac{1}{x^2}\right)^n (1 + x^2)^n$ is

A. ${}^{2n}C_n x^{2n}$

B. ${}^{2n}C_n x^{-2n}$

C. ${}^{2n}C_n$

D. ${}^{2n}C_{n-1}$

Answer: C



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25. If $T_0, T_1, T_2, , T_n$ represent the terms in the expansion of $(x + a)^n$, then find the value of $(T_0 - T_2 + T_4 -)^2 + (T_1 - T_3 + T_5 -)^2 n \in N$.

A. $(x^2 + a^2)$

B. $(x^2 + a^2)^n$

C. $(x^2 + a^2)^{1/n}$

D. $(x^2 + a^2)^{-1/n}$

Answer: B



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26. The sum $\sum_{i=0}^m {}^{10}C_i \times {}^{20}C_{m-i}$ (where ${}^pC_q = 0$ if $p < q$)

is maximum, when m is

A. 5

B. 10

C. 15

D. 20

Answer: C



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27. If $m = (2013)!$ then the value of

$\frac{1}{\log_2 m} + \frac{1}{\log_3 m} + \dots + \frac{1}{\log_{2013} m}$ is equal to

A. 1

B. $(2013)!$

C. $\frac{1}{(2013)!}$

D. None of these

Answer: A



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28. $\sum_{r=0}^n nC_r (\sin rx)$ is equal to

A. $2^n \cdot \cos^n \frac{x}{2} \cdot \sin \frac{nx}{2}$

B. $2^n \cdot \sin^n \frac{x}{2} \cdot \cos \frac{nx}{2}$

C. $2^{n+1} \cdot \cos^n \frac{x}{2} \cdot \sin \frac{nx}{2}$

D. $2^{n+1} \cdot \sin^n \frac{x}{2} \cdot \cos \frac{nx}{2}$

Answer: A



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29. Let t_n denote the n^{th} term in a binomial expansion. If $\frac{t_6}{t_5}$ in the expansion of $(a + b)^{n+4}$ and $\frac{t_5}{t_4}$ in the expansion of $(a + b)^n$ are equal, then n is

A. 9

B. 11

C. 13

D. 15

Answer: D



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30. The value of the expression

$$1 - \left(\left(\frac{n}{1} \right) \cdot \left(\frac{1+x}{1+nx} \right) + \left(\frac{n(n-1)}{1.2} \right) \left(\frac{1+2x}{(1+nx)^2} \right) - \left(\frac{n(n-1)(n-2)}{1.2.3} \right) \right)$$

A. 2

B. 1

C. 3

D. 0

Answer: D



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