



MATHS

BOOKS - ARIHANT MATHS

BINOMIAL THEOREM

Examples

1. Expand $\left(2a - \frac{3}{b}\right)^5$ by binomial theorem



[Watch Video Solution](#)

2. Evaluate the following: $(x + \sqrt{x^2 - 1})^6 + (x - \sqrt{x^2 - 1})^6$



[Watch Video Solution](#)

3. In the expansion of $(x + a)^n$ if the sum of odd terms is P and the sum of even terms is Q , then
- a. $P^2 - Q^2 = (x^2 - a^2)^n$ b. $4PQ = (x + a)^{2n} - (x - a)^{2n}$
- c. $2(P^2 + Q^2) = (x + a)^{2n} + (x - a)^{2n}$
- d. none of these

 [Watch Video Solution](#)

4. Using binomial theorem, prove that $(101)^{50} > 100^{50} + 99^{50}$.

 [Watch Video Solution](#)

5. If $a_n = \sum_{r=0}^n \frac{1}{{}^n C_r}$, find the value of $\sum_{r=0}^n \frac{r}{{}^n C_r}$

 [Watch Video Solution](#)

6. Find the number of dissimilar terms in

the expansion of $(1 - 3x + 3x^2 - x^3)^{33}$

 [Watch Video Solution](#)

7. Find the sum of $\sum_{r=1}^n \frac{r^n C_r}{{}^n C_{r-1}}$.

 [Watch Video Solution](#)

8. Prove that

$$(C_0 + C_1)(C_1 + C_2)(C_2 + C_3)(C_3 + C_4)\dots\dots\dots (C_{n-1} + C_n) = \frac{C_0 C_1 C_2 \dots \cdot C_{n-1} (n+1)^n}{n!}$$

 [Watch Video Solution](#)

9.

$$\sum_{r=0}^n (-1)^r \cdot n C_r \left[\frac{1}{2^r} + \frac{3}{2^{2r}} + \frac{7}{2^{3r}} + \frac{15}{2^{4r}} + \dots \cdot m \text{ terms} \right] = \frac{2^{mn} - 1}{2^{mn} (2^n - 1)}$$



Watch Video Solution

10. The seventh term in the expansion of $\left(4x - \frac{1}{2\sqrt{x}}\right)^{13}$ is



Watch Video Solution

11. Find the coefficient of x^8 in the expansion of $\left(x^2 - \frac{1}{x}\right)^{10}$



Watch Video Solution

12. Find the coefficient of x^7 in the expansion of $\left(ax^2 + \frac{1}{bx}\right)^{11}$.

(ii) the coefficient of x^{-7} in the expansion of $\left(ax - \frac{1}{bx^2}\right)^{11}$.

Also, find the relation between a and b , so that these coefficients are equal.



Watch Video Solution

13. Find the term independent of x in the expansion of $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$.

 [Watch Video Solution](#)

14. Write the 4th term from the end in the expansion of $\left(\frac{x^3}{2} - \frac{2}{x^2}\right)^9$.

 [Watch Video Solution](#)

15. Find the $(n+1)$ th term from the end in

the expansion of $\left(2x - \frac{1}{x}\right)^{3n}$

 [Watch Video Solution](#)

16. Find the number of terms in the

expansion of $(\sqrt[2]{9} + \sqrt[2]{8})^{500}$ which are integers.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

18. The number of irrational terms in the expansion of $(\sqrt[8]{5} + \sqrt[6]{2})^{100}$ is

 [Watch Video Solution](#)

19. Prove that $\cos 4x = 2 \cos^2(2x) - 1$

 [Watch Video Solution](#)

20. If a, b, c, d be four consecutive coefficients in the binomial expansion of $(1 + x)^n$, then value of the expression

$\left(\left(\frac{b}{b+c}\right)^2 - \frac{ac}{(a+b)(c+d)}\right)$ (where $x > 0$ and $n \in \mathbb{N}$) is

 [Watch Video Solution](#)

21. If the 2nd, 3rd and 4th terms in the expansion of $(x + a)^n$ are 240, 720 and 1080 respectively, find x , a , n .

 [Watch Video Solution](#)

22. Find the middle term in the expansion of: $\left(\frac{a}{x} + bx\right)^{12}$

 [Watch Video Solution](#)

23. Find the middle term (terms) in the expansion of

$$\left(\frac{x}{a} - \frac{a}{x}\right)^{10}$$

 [Watch Video Solution](#)

24. Show that the middle term in the expansion of $(1 + x)^{2n}$ is $\frac{1.3.5 \dots (2n - 1)}{n!} 2^n x^n$, where n is a positive integer.



Watch Video Solution

25. Find numerically greatest term in the expansion of $(2 + 3x)^9$, when $x = 3/2$.



Watch Video Solution

26. Find the numerically greatest term in the expansion of $(3 - 5x)^{15}$ when $x = 1/5$.



Watch Video Solution

27. Show that , if the greatest term in the expansion of $(1 + x)^{2n}$ has also the greatest coefficient

then x lies between $\frac{n}{n+1}$ and $\frac{n+1}{n}$



Watch Video Solution

28. Find out the sum of the coefficients in the expansion of the binomial $(5p - 4q)^n$, where n is a +ive integer.

 [Watch Video Solution](#)

29. In the expansion of $\left(3^{-x/4} + 3^{5x/4}\right)^n$ the sum of binomial coefficient is 64 and term with the greatest binomial coefficient exceeds the third by $(n - 1)$, the value of x must be 0 b. 1 c. 2 d. 3

 [Watch Video Solution](#)

30. Find the sum of $\frac{1}{1!(n-1)!} + \frac{1}{3!(n-3)!} + \frac{1}{5!(n-5)!} + \dots$,

 [Watch Video Solution](#)

31. Find the values of $\frac{1}{12!} + \frac{1}{10!2!} + \frac{1}{8!4!} + \dots + \frac{1}{12!}$

 [Watch Video Solution](#)

32. The sum of the coefficients of the polynomial $(1 + x - 3x^2)^{2163}$ is

 [Watch Video Solution](#)

33. If the sum of the coefficient in the expansion of $(\alpha x^2 - 2x + 1)^{35}$ is equal to the sum of the coefficient of the expansion of $(x - \alpha y)^{35}$, then $\alpha =$

 [Watch Video Solution](#)

34. If $(1 + x + 2x^2)^{20} = a_0 + a_1x + a_2x^2 + \dots + a_{40}x^{40}$.

The value of $a_0 + a_2 + a_4 + \dots + a_{38}$ is

 [Watch Video Solution](#)

35. Show that the integral part of

$(5 + 2\sqrt{6})^n$ is odd where n is natural number

 [Watch Video Solution](#)

36. Show that the integral part of

$(5\sqrt{5} + 11)^{2n+1}$ is even where $n \in \mathbb{N}$.

 [Watch Video Solution](#)

37. Express the given complex number in the form $a + ib$: i^{-12}

 [Watch Video Solution](#)

38. If $(7 + 4\sqrt{3})^n = s + t$, where n and s are

positive integers and t is a proper fraction, show that

$$(1 - t)(s + t) = 1$$



[Watch Video Solution](#)

39. Express the given complex number in the form $a + ib$: $(3i) \left(-\frac{2}{3} \right) i$



[Watch Video Solution](#)

40. Show that

$1992^{1998} - 1955^{1998} - 1938^{1998} + 1901^{1998}$ is divisible by 1998



[Watch Video Solution](#)

41. Prove that $2222^{5555} + 5555^{2222}$ is

divisible by 7 .



[Watch Video Solution](#)

42. If n is any positive integer, show that

$2^{3n+3} - 7n - 8$ is divisible by 49.

 [Watch Video Solution](#)

43. If 10^m divides the number $101^{100} - 1$ then, find the greatest value of m .

 [Watch Video Solution](#)

44. If 7^{103} is divided by 25, find the remainder.

 [Watch Video Solution](#)

45. Find the remainder when $x = 5^5 \wedge 5 \wedge 5$ (24 times 5) is divided by 24.

 [Watch Video Solution](#)

46. If 7 divides $32^{32^{32}}$, then find the remainder

 [Watch Video Solution](#)

47. The last two digits of the number 3^{400} are:

(A) 81 (B) 43 (C) 29 (D) 01

 [Watch Video Solution](#)

48. If the number is 17^{256} , find the last two digits

 [Watch Video Solution](#)

49. If the number is 17^{256} , find the last digit

 [Watch Video Solution](#)

50. If the number is 17^{256} , find the last digit



Watch Video Solution

51. Find the greater number is 100^{100} and $(300)!$.



Watch Video Solution

52. Find the greater number in $300!$ and

$$\sqrt{300^{\sqrt{300}}}$$



Watch Video Solution

53. If $(1 + x)^n = C_0 + C_1x + C_2x^2$

$+ C_3x^3 + C_4x^4 + \dots$, find the values of

(i) $C_0 - C_2 + C_4 - C_6 + \dots$

(ii) $C_1 - C_3 + C_5 - C_7 + \dots$

(iii) $C_0 + C_3 + C_6 + \dots$

 [Watch Video Solution](#)

54. Find the value of ${}^{4n}C_0 + {}^{4n}C_4 + {}^{4n}C_8 + \dots + {}^{4n}C_{4n}$.

 [Watch Video Solution](#)

55. Find the coefficient of $a^2b^3c^4d$ in the expansion of $(a - b - c + d)^{10}$.

 [Watch Video Solution](#)

56. Find the coefficient of $a^3b^4c^5$ in the expansion of $(bc + ca + ab)^6$

 [Watch Video Solution](#)

57. Find the total number of distinct or dissimilar terms in the expansion of

$$(x + y + z + w)^n, n \in \mathbb{N}$$

 [Watch Video Solution](#)

58. Find the greatest coefficient in the expansion of $(a + b + c + d)^{15}$.

 [Watch Video Solution](#)

59. Find the coefficient of x^7 in the expansion of $(1 + 3x - 2x^3)^{10}$.

 [Watch Video Solution](#)

60. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$, prove that

$$C_1 + 2C_2 + 3C_3 + \dots + nC_n = n \cdot 2^{n-1}$$

 [Watch Video Solution](#)

61. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$, prove that

$$C_0 + 2C_1 + 3C_2 + \dots + (n + 1)C_n = (n + 2)2^{n-1}.$$

 [Watch Video Solution](#)

62. If $(1 + x)^n = c_0 + c_1x + c_2x^2 + \dots + c_nx^n$ then the value of $c_0 + 3c_1 + 5c_2 + \dots + (2n + 1)c_n$ is-

 [Watch Video Solution](#)

63. Find the modulus of the complex number $z = -3 - i4$

 [Watch Video Solution](#)

64. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$, prove that $(1 \cdot 2)C_2 + (2 \cdot 3)$

$$C_3 + \dots + \{(n-1) \cdot n\}C_n = n(n-1)2^{n-2}.$$



Watch Video Solution

65. $(1+x)^n = C_0 + C_1x + C_2x^2 + C_3x^3 + \dots + C_nx^n$, prove

that $C_0 - 2C_1 + 3C_2 - 4C_3 + \dots + (-1)^n(n+1)C_n = 0$



Watch Video Solution

66.

If

$(1+x)^n = c_0 + C_1x + C_2x^2 + \dots + C_nx^n$, using derivatives prove that

$C_1 - 2C_2 + 3C_3 + \dots + (-1)^{n-1}nC_n = 0$



Watch Video Solution

67. Prove that : $C_0 - 3C_1 + 5C_2 - \dots + (-1)^n(2n+1)C_n = 0$



Watch Video Solution

68. Prove that ${}^n C_0 + \frac{{}^n C_1}{2} + \frac{{}^n C_2}{3} + \dots + \frac{{}^n C_n}{n+1} = \frac{2^{n+1} - 1}{n+1}$.

 [Watch Video Solution](#)

69. Find the given complex number in the form $a + ib$: $i^4 + i^2 - 1$

 [Watch Video Solution](#)

70. If $(1+x)^n = C_0 + C_1x + C_2x^2 + C_3x^3 + \dots + C_nx^n$ prove that

$$\frac{C_0}{1} + \frac{C_2}{3} + \frac{C_4}{5} + \dots = \frac{2^n}{n+1}.$$

 [Watch Video Solution](#)

71. If $(1+x)^n = C_0 + C_1x + C_2x^2 + C_3x^3$

$+ \dots + C_nx^n$, prove that $\frac{C_1}{2} + \frac{C_3}{4} + \frac{C_5}{6} + \dots = \frac{2^n - 1}{n+1}$.

 [Watch Video Solution](#)

72. $3C_0 + 3^2 \frac{C_1}{2} + 3^3 \frac{C_2}{3} + \dots \dots \dots 3^{n+1} \cdot \frac{C_n}{n+1}$ equal to

 [Watch Video Solution](#)

73. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$,

Show

that

$$\frac{2^2}{1 \cdot 2} C_0 + \frac{2^3}{2 \cdot 3} C_1 + \frac{2^4}{3 \cdot 4} C_2 + \dots + \frac{2^{n+2} C_n}{(n+1)(n+2)} = \frac{3^{n+2}}{(n+1)(n+2)}$$

 [Watch Video Solution](#)

74.

Prove

that

$$C_0C_r + C_1C_{r+1} + C_2C_{r+2} + \dots \dots \dots + c_{n-r}C_n = \frac{(2n)!}{(n-r)!(n+r)!}$$

 [Watch Video Solution](#)

75. Express the following complex number in the form of $a + ib$:

$$2(5 + i5) + i(5 + i5)$$



Watch Video Solution

76. Express the following complex number in the form $a + ib$:

$$(1 + i) - (-1 + 5i)$$



Watch Video Solution

77. Express the given complex number un the form of $a + ib$: $(5 + 3i)^3$



Watch Video Solution

78. If m, n, r are positive integers such that $r < m, n$, then

$${}^m C_r + {}^m C_{r-1} {}^n C_1 + {}^m C_{r-2} {}^n C_2 + \dots + {}^m C_1 {}^n C_{r-1} + {}^n C_r \text{ equals}$$



Watch Video Solution

79. Express the following complex number in the form $a + ib$:

$$\left(\frac{1}{3} + i\frac{2}{3}\right) - \left(2 + i\frac{3}{2}\right)$$

 [Watch Video Solution](#)

80. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$, prove that

$$C_1 + 2C_2 + 3C_3 + \dots + nC_n = n \cdot 2^{n-1}$$

 [Watch Video Solution](#)

81. Express the following complex number in the form $a + ib$:

$$\left[\left(\frac{1}{5} + i\frac{7}{5}\right) + \left(4 + i\frac{1}{3}\right)\right] - \left(-\frac{4}{3} + i\right)$$

 [Watch Video Solution](#)

82. Find the sum $\sum_{r=0}^n \binom{n+r}{r} C_r$.

 [Watch Video Solution](#)

83. Express the following complex number in the form $a + ib$: $(1 - i)^2$



Watch Video Solution

84. Find the multiplicative inverse of $Z = -2i$



Watch Video Solution

85. If $C_0, C_1, C_2, \dots, C_n$ denote the binomial

coefficients in the expansion of $(1 + x)^n$, then $\sum_{r=0}^n (r + 1)(C_r)$



Watch Video Solution

86. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$, find the values of the

following . $\sum_{i=0}^n \sum_{j=0}^n (i + j)C_iC_j$



Watch Video Solution

 Watch Video Solution

87. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$,

find the values of the following

$$\sum_{0 \leq i < j \leq n} jC_i$$

 Watch Video Solution

88. Express the following complex number in the form $a + ib$:

$$(3 + 5i)(3 - 5i)$$

 Watch Video Solution

89. Express the following complex number in the form $a + ib$: $(4 - 2i)^2$

 Watch Video Solution

90. Find the multiplicative inverse of the following function $3 + 4i$



Watch Video Solution

91. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$,

find the values of the following

$$\sum_{0 \leq i \leq j \leq n} (i + j)(C_i \pm C_j)^2$$



Watch Video Solution

92. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$,

find the values of the following

$$\left(\sum \sum \right)_{0 \leq i \leq j \leq n} (i + j)(C_i \pm C_j)^2$$



Watch Video Solution

93. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$,

find the values of the following

$$\sum_{0 \leq i \leq j \leq n} C_i C_j$$



Watch Video Solution

94. If $\binom{2n+1}{0} + \binom{2n+1}{3} + \binom{2n+1}{6} + \dots = 170$, then n equals

A. 2

B. 4

C. 6

D. 8

Answer: b



Watch Video Solution

95.

$$({}^m C_0 + {}^m C_1 - {}^m C_2 - {}^m C_3) + ({}^m C_4 + {}^m C_5 - {}^m C_6 - {}^m C_7) + \dots = 0$$

if and only if for some positive integer $k, m =$

A. $4k$

B. $4k + 1$

C. $4k - 1$

D. $4k + 2$

Answer: c



Watch Video Solution

96. The coefficient of x^n in $(1 + x)^{101} (1 - x + x^2)^{100}$ is non zero, then n cannot be of the form

A. $3\lambda + 1$

B. 3λ

C. $3\lambda + 2$

D. $4\lambda + 1$

Answer: c

 [Watch Video Solution](#)

97. Find the multiplicative inverse of the following function $z = 5 - 6i$

 [Watch Video Solution](#)

98. If ${}^{n-1}C_r = (k^2 - 3)^n {}^n C_{r+1}$, then $k \in$

A. $(-\infty, -2]$

B. $[2, \infty)$

C. $[-\sqrt{3}, \sqrt{3}]$

D. $(\sqrt{3}, 2]$

Answer: d

 [Watch Video Solution](#)

99.

If

$$\left(x + \frac{1}{x} + 1\right)^6 = a_0 + \left(a_1x + \frac{b_1}{x}\right) + \left(a_2x^2 + \frac{b_2}{x^2}\right) + \dots + \left(a_6x^6 + \frac{b_6}{x}\right)$$

, then find the value of a_0

A. 121

B. 131

C. 141

D. 151

Answer: c
[Watch Video Solution](#)

100. The coefficient of x^{50} in the series

$$\sum_{r=1}^{101} rx^{r-1}(1+x)^{101-r} \text{ is}$$

A. $^{100}C_{50}$ B. $^{101}C_{50}$

C. $^{102}C_{50}$

D. $^{103}C_{50}$

Answer: b



Watch Video Solution

101. The largest integer λ such that 2^λ divides

$3^{2^n} - 1, n \in N$ is

A. $n - 1$

B. n

C. $n + 1$

D. $n + 2$

Answer:



Watch Video Solution

102. If the last term in the binomial expansion of $\left(2^{\frac{1}{3}} - \frac{1}{\sqrt{2}}\right)^n$ is $\left(\frac{1}{3^{\frac{5}{3}}}\right)^{\log_3 8}$, then 5th term from the beginning is 210 b. 420 c. 105 d. none of these

A. ${}^{10}C_6$

B. $2^{10}C_4$

C. $\frac{1}{2} \cdot {}^{10}C_4$

D. None of the above

Answer:



[Watch Video Solution](#)

103. Find the derivative of $(px + q)\left(\frac{r}{x} + s\right)$, where p,q,r and s are non zero constants .



[Watch Video Solution](#)

104. Let $a_n = \left(1 + \frac{1}{n}\right)^n$. Then for each $n \in \mathbb{N}$

A. $a_n \geq 2$

B. $a_n < 3$

C. $a_n < 4$

D. $a_n < 2$

Answer: a, b, c



Watch Video Solution

105. Find the derivative of $(ax + b)(cx + d)^2$, where a,b,c and d are non zero constants .



Watch Video Solution

106. If $a + b = k$, when $a, b > 0$ and

$$S(k, n) = \sum_{r=0}^n r^2 \binom{n}{r} a^r \cdot b^{n-r}, \text{ then}$$

A. $S(1, 3) = 3(3a^2 + ab)$

B. $S(2, 4) = 16(4a^2 + ab)$

C. $S(3, 5) = 25(5a^2 + ab)$

D. $S(4, 6) = 36(6a^2 + ab)$

Answer: a, b



Watch Video Solution

107. The value of x , for which the ninth term in the

expansion of $\left\{ \frac{\sqrt{10}}{(\sqrt{x})^{5 \log_{10} x}} + x \cdot x^{\frac{1}{2 \log_{10} x}} \right\}^{10}$

is 450 is equal to

A. 10

B. 10^2

C. $\sqrt{10}$

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

Answer: b, d



Watch Video Solution

108. For a positive integer n , if the expansion of

$\left(\frac{5}{x^2} + x^4\right)^n$ has a term independent of x , then n can be

A. 18

B. 27

C. 36

D. 45

Answer: a, b, c, d



Watch Video Solution

109. Consider $(1 + x + x^2)^n = \sum_{r=0}^{2n} a_r x^r$, where $a_0, a_1, a_2, \dots, a_{2n}$ are real number and n is positive integer.

If n is even, the value of $\sum_{r=0}^{\frac{n}{2}-1} a_{2r}$ is

 [Watch Video Solution](#)

110. Consider $(1 + x + x^2)^n = \sum_{r=0}^n a_r x^r$, where $a_0, a_1, a_2, \dots, a_{2n}$ are real number and n is positive integer.

If n is odd, the value of $\sum_{r=1}^2 a_{2r-1}$ is

A. $\frac{9^n - 1}{2}$

B. $\frac{9^n - 1}{4}$

C. $\frac{9^n + 1}{2}$

D. $\frac{9^n + 1}{4}$

Answer: b

 [Watch Video Solution](#)

111. Consider $(1 + x + x^2)^n = \sum_{r=0}^{2n} a_r x^r$, where $a_0, a_1,$

a_2, \dots, a_{2n} are real numbers and n is a positive integer.

The value of a_2 is

A. $^{4n+1}C_2$

B. $^{3n+1}C_2$

C. $^{2n+1}C_2$

D. $^{n+1}C_2$

Answer: c

 [Watch Video Solution](#)

112. Let $S = \sum_{r=1}^{30} \frac{{}^{30+r}C_r(2r-1)}{{}^{30}C_r(30+r)}$, $K = \sum_{r=0}^{30} ({}^{30}C_r)^2$

and $G = \sum_{r=0}^{60} (-1)^r ({}^{60}C_r)^2$

The value fo (G-S)is

A. 0

B. 1

C. 2^{30}

D. 2^{60}

Answer: b

 [Watch Video Solution](#)

113. Let $S = \sum_{r=1}^{30} \frac{{}^{30+r}C_r(2r-1)}{{}^{30}C_r(30+r)}$, $K = \sum_{r=0}^{30} ({}^{30}C_r)^2$

and $G = \sum_{r=0}^{60} (-1)^r ({}^{60}C_r)^2$

The value (SK_SG) is

A. 0

B. 1

C. 2^{30}

D. 2^{60}

Answer: a



Watch Video Solution

114. Let $S = \sum_{r=1}^{30} \frac{{}^{30+r}C_r(2r-1)}{{}^{30}C_r(30+r)}$, $K = \sum_{r=0}^{30} ({}^{30}C_r)^2$

and $G = \sum_{r=0}^{60} (-1)^r ({}^{60}C_r)^2$

The value of $K + G$ is

A. $2S - 2$

B. $2S - 1$

C. $2S + 1$

D. $2S + 2$

Answer: d



Watch Video Solution

115. The digit at units place in $2^9 \wedge 100$ is (A) 2 (B) 4 (C) 6 (D) 8



Watch Video Solution

116. If

$$(1 + x)^n = \sum_{r=0}^n a_r x^r \text{ and } b_r = 1 + \frac{a_r}{a_{r-1}} \text{ and } \prod_{r=1}^n b_r = \frac{(101)^{100}}{100!},$$

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



Watch Video Solution

117. Statement-1 (Assertion) and Statement-2 (Reason)

Each of the these examples also has four lalternative choices ,
only one of which is the correct answer. You have to select the correct
choice as given below .

$(7^9 + 9^7)$ is divisible by 16

Statement-2 $(x^y + y^x)$ is divisible by $(x + y)$, $\forall x, y$.

- A. Statement-1 is true ,Statement-2 is true, Statement-2 is a correct explanation for Statement-1
- B. Statement-1 is true ,Statement-2 is true, Statement-2 is not a correct explanation for Statement-1
- C. Statement-1 is true ,Statement-2 is false
- D. Statement-1 is true ,Statement-2 is true

Answer: c



Watch Video Solution

118. Statement-1 (Assertion) and Statement-2 (Reason)

Each of these examples also has four alternative choices , only one of which is the correct answer. You have to select the correct choice as given below .

Number of distinct terms in the

sum of expansion $(1 + ax)^{10} + (1 - ax)^{10}$ is 22.

- A. Statement-1 is true ,Statement-2 is true, Statement-2 is a correct explanation for Statement-1
- B. Statement-1 is true ,Statement-2 is true, Statement-2 is not a correct explanation for Statement-1
- C. Statement-1 is true ,Statement-2 is false
- D. Statement-1 is false ,Statement-2 is true

Answer: d

 [Watch Video Solution](#)

119. Find the term independent of x in the expansion of $(1 + x + 2x^3) \left[\left(\frac{3x^2}{2} \right) - \left(\frac{1}{3} \right) \right]^9$

 [Watch Video Solution](#)

120. $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$,

show that $\sum_{r=0}^n C_r^3$ is equal to the coefficient of $x^n y^n$ in the

expansion of $\{(1 + x)(1 + y)(x + y)\}^n$.

 [Watch Video Solution](#)

121. Let $(1 + x^2)^2(1 + x)^n = \sum_{k=0}^{n+4} a_k x^k$. If a_1, a_2 and a_3 are in arithmetic

progression, then the possible value/values of n is/are

 [Watch Video Solution](#)

122. if $(1 - x^3)^n = \sum_{r=0}^n a_r x^r (1 - x)^{3n-2r}$, where $n \in \mathbb{N}$ then find a_r .

 [Watch Video Solution](#)

123. If $a_0, a_1, a_2, \dots, a_{2n}$ are the coefficients in the

expansion of $(1 + x + x^2)^n$ in ascending power of x show

that $a_0^2 - a_1^2 + a_2^2 - \dots + a_{2n}^2 = a_n$.

 [Watch Video Solution](#)

124. Show that no three consecutive binomial coefficients can be in (i) G.P.,
(ii) H.P.

 [Watch Video Solution](#)

125. Show that no three consecutive binomial coefficients can be in GP .

 [Watch Video Solution](#)

126. Evaluate $\sum_{i=0}^n \sum_{j=0}^n {}^n C_j \cdot {}^j C_i, i \leq j$.

 [Watch Video Solution](#)

127. Find the remainder when 27^{40} is divided by 12.



Watch Video Solution

128. Convert the following complex number in polar form : $(3)^{\frac{1}{2}} + i$



Watch Video Solution

129. Find number of rational terms in $(\sqrt{2} + 3^{\frac{1}{3}} + 5^{\frac{1}{6}})^{10}$



Watch Video Solution

130. Find the remainder when $1690^{2608} + 2608^{1690}$ is divided by 7.



Watch Video Solution

131. If $C_0, C_1, C_2, \dots, C_n$ are the binomial coefficients

in the expansion of $(1+x)^n$, prove that

$$(C_0 + 2C_1 + C_2)(C_1 + 2C_2 + C_3) \dots (C_{n-1} + 2C_n + C_{n+1}) \\ \frac{(n-2)^n}{(n+1)!} \prod_{r=1}^n (C_{r-1} + C_r).$$



Watch Video Solution

132. If $\sum_{r=0}^{2n} a_r (x-2)^r = \sum_{r=0}^{2n} b_r (x-3)^r$ and $a_k = 1$ for all $k \geq n$, then show that $b_n = {}^{2n+1}C_{n+1}$.



Watch Video Solution

133. If n is an odd natural number, then $\sum_{r=0}^n \frac{(-1)^r}{nC_r}$ is equal to



Watch Video Solution

134. If n is an odd natural number, prove that

$$\sum_{r=0}^n \frac{(-1)^r}{{}^nC_r} = 0$$



[Watch Video Solution](#)

135. Find the solution of the given inequality $15 > 4x - 5 > 3$



[Watch Video Solution](#)

136. Solve the equation $x^2 - 2 = 0$



[Watch Video Solution](#)

137. Find the given complex number in polar form : i



[Watch Video Solution](#)

138. Solve the equation

$$3x^2 + 2x - 1 = 0$$

 [Watch Video Solution](#)

139. Prove that $\sum_{k=0}^9 x^k$ divides $\sum_{k=0}^9 x^{kkkk}$

 [Watch Video Solution](#)

140. Prove that $\sum_{r=1}^k (-3)^{r-1} \cdot 3^n C_{2r-1} = 0$, where $k = \frac{3n}{2}$ and n is an even integer.

 [Watch Video Solution](#)

141. Prove that

$${}^n C_3 + {}^n C_7 + {}^n C_{11} + \dots = \frac{1}{2} \left\{ 2^{n-1} - 2^{n/2} \sin \frac{n\pi}{4} \right\}$$

 [Watch Video Solution](#)

142. Evaluate $\sum_{i=0}^n \sum_{j=0}^n {}^n C_j \cdot {}^j C_i, i \leq j$.

 [Watch Video Solution](#)

143. If $(9 + 4\sqrt{5})^n = I + f$, n and I being positive integers and f is a proper fraction, show that $(I - 1)f + f^2$ is an even integer.

 [Watch Video Solution](#)

144. Find the solution of given inequality for real x : $2(2x + 3) < (x - 2)$

 [Watch Video Solution](#)

1. Convert the given complex number in polar form $-1 + i$



Watch Video Solution

2. Find the given complex number in polar form : -3



Watch Video Solution

Exercise For Session 1

1. The value of $\sum_{r=0}^{10} r^{10} C_r 3^r (-2)^{10-r}$ is 20 b. 10 c. 300 d. 30

A. 10

B. 20

C. 30

D. 300

Answer: c



Watch Video Solution

2. The number of distinct terms in the expansion of $\left(x + \frac{1}{x} + \frac{1}{x^2}\right)^{15}$ is/are (with respect to different power of x) 255 b. 61 c. 127 d. none of these

A. 61

B. 121

C. 255

D. 16

Answer: a



Watch Video Solution

3. The expression $\left[x + (x^3 - 1)^{\frac{1}{2}}\right]^5 + \left[x - (x^3 - 1)^{\frac{1}{2}}\right]^5$ is a polynomial of degree

A. 5

B. 6

C. 6

D. 8

Answer: c



[Watch Video Solution](#)

4. $(\sqrt{2} + 1)^6 - (\sqrt{2} - 1)^6$ is equal to

A. 101

B. $70\sqrt{2}$

C. $140\sqrt{2}$

D. $120\sqrt{2}$

Answer: c



[Watch Video Solution](#)

5. Solve the given equation $x^2 + 4x + 2 = 0$



[Watch Video Solution](#)

6. The number of non-zero terms in the expansion of

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

A. 0

B. 5

C. 9

D. 10

Answer: b



Watch Video Solution

7. If $(1+x)^n = \sum_{r=0}^n C_r x^r, \left(1 + \frac{C_1}{C_0}\right) \left(1 + \frac{C_2}{C_1}\right) \dots \left(1 + \frac{C_n}{C_{n-1}}\right)$ is equal to

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

Answer: c



Watch Video Solution

8. If ${}^{n+1}C_{r+1} : {}^n C_r : {}^{n-1}C_{r-1} = 11 : 6 : 3$, find the values of n and r .

A. 20

B. 30

C. 0

D. 50

Answer: c



[Watch Video Solution](#)

Exercise For Session 2

1. Solve the given equation $-2x^2 + 3x - 4 = 0$



[Watch Video Solution](#)

2. If the fourth term in the expansion of $\left(px + \frac{1}{x}\right)^n$ is $\frac{5}{2}$, then $(n, p) =$

A. $\frac{9}{2}$

B. $\frac{11}{2}$

C. $\frac{13}{2}$

D. $\frac{15}{2}$

Answer: c



Watch Video Solution

3. $\left(\frac{2^1}{3} + \frac{1}{3^1}/3\right)^n$ if the ratio of $7th$ term from the beginning to the $7th$ term from the end is $\frac{1}{6}$, then find the value of n

A. 3

B. 5

C. 7

D. 9

Answer: d



Watch Video Solution

4. Find the number of integral terms in the expansion of $\left(5^{\frac{1}{2}} + 7^{\frac{1}{8}}\right)^{1024}$.

A. 128

B. 129

C. 130

D. 131

Answer: b



[Watch Video Solution](#)

5. In the expansion of $\left(7^{\frac{1}{3}} + 11^{\frac{1}{9}}\right)^{6561}$, the number of terms free from radicals is:

A. 715

B. 725

C. 730

D. 750

Answer: c



[Watch Video Solution](#)

6. If the coefficients of three consecutive terms in the expansion of $(1 + x)^n$ are 165,330 and 462 respectively, the value of n is

A. 7

B. 9

C. 11

D. 13

Answer: c



[Watch Video Solution](#)

7. If the coefficients of 5th, 6th , and 7th terms in the expansion of $(1 + x)^n$ are in A.P., then $n =$

- A. 7only
- B. 14 only
- C. 7 or 14
- D. None of these

Answer: c



[Watch Video Solution](#)

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

- A. 8
- B. 12
- C. 16

D. 20

Answer: b



[Watch Video Solution](#)

9. If the sum of the binomial coefficients in the expansion of $\left(x^2 + \frac{2}{x^3}\right)^n$ is 243, the term independent of x is equal to

A. 40

B. 30

C. 20

D. 10

Answer: a



[Watch Video Solution](#)

10. If $x = (3 - i)$, $y = (2 + i)$, find $\left| \frac{x + y + 1}{x - y + 1} \right|$

 [Watch Video Solution](#)

Exercise For Session 3

1. If $R = (7 + 4\sqrt{3})^{2n} = 1 + f$, where $n \in \mathbb{N}$ and

$0 < f < 1$, then $R(1 - f)$ equals

A. (a) 1

B. (b) 0

C. (c) -1

D. (d) even integer

Answer: a

 [Watch Video Solution](#)

2. Let $(5 + 2\sqrt{6})^n = I + f$, where $n, I \in \mathbb{N}$ and $0 < f < 1$, then

the value of $f^2 - f + I \cdot f - I$ is



Watch Video Solution

3. If $n > 0$ is an odd integer and

$x = (\sqrt{2} + 1)^n$, $f = x - [x]$, then $\frac{1 - f^2}{f}$ is

- A. an irrational number
- B. a non-integer rational number
- C. an odd number
- D. an even number

Answer: d



Watch Video Solution

4. Integral part of $(\sqrt{2} + 1)^6$ is

A. (a)196

B. (b)197

C. (c)198

D. (d)199

Answer: b

 [Watch Video Solution](#)

5. $(103)^{86} - (86)^{103}$ is divisible by

A. 7

B. 13

C. 17

D. 23

Answer: c

 [Watch Video Solution](#)

6. fractional part of $\frac{2^{78}}{31}$ is:

A. $\frac{2}{31}$

B. $\frac{4}{31}$

C. $(8)/(31)'$

D. $(16)/(31)'$

Answer: c



[Watch Video Solution](#)

7. The unit digit of $17^{1983} + 11^{1983}$ is

A. 4

B. 2

C. 3

D. 0

Answer: a



[Watch Video Solution](#)

8. The last two digits of the number $(23)^{14}$ are 01 b. 03 c. 09 d. none of these

A. 01

B. 03

C. 09

D. 27

Answer: c



[Watch Video Solution](#)

9. The last four digits of the natural number 3^{100} are

A. 2001

B. 3211

C. 1231

D. 1

Answer: a



[Watch Video Solution](#)

10. The remainder when 23^{23} is divided by 53 is

A. 17

B. 21

C. 30

D. 47

Answer: c



Watch Video Solution

Exercise For Session 4

1. The coefficient of $a^8b^4c^9d^9$ in $(abc + abd + acdd + bcd)^{10}$ is $10!$ b.

$\frac{10!}{8!4!9!9!}$ c. 2520 d. none of these

A. $10!$

B. $\frac{10!}{4!8!9!9!}$

C. 2520

D. None of these

Answer: c



Watch Video Solution

2. If $(1 + 2x + 3x^2)^{10} = a_0 + a_1x + a_2x^2 + \dots + a_{20}x^{20}$, then a_1 equals

A. 210

B. 20

C. 10

D. None of these

Answer: b



[Watch Video Solution](#)

3. If $(1 + x + x^2 + x^3)^5 = a_0 + a_1x + a_2x^2 + \dots + a_{15}x^{15}$, then a_{10}

equals to

A. 99

B. 100

C. 101

D. 110

Answer: c



Watch Video Solution

4. Coefficient of x^{15} in $(1 + x + x^3 + x^4)^n$ is

A. A. $\sum_{r=0}^5 {}^n C_{5-r} \cdot {}^n C_{3r}$

B. B. $\sum_{r=0}^5 {}^n C_{5r}$

C. C. $\sum_{r=0}^5 {}^n C_{2r}$

D. D. $\sum_{r=0}^5 {}^n C_{3-r} \cdot {}^n C_{5r}$

Answer: a



Watch Video Solution

5. In the expansion of $\left(x^2 + 1 + \frac{1}{x^2}\right)^n$, $n \in N$,

A. ${}^{n+2}C_2$

B. ${}^{n+3}C_2$

C. ${}^{2n+1}C_{2n}$

D. ${}^{3n+1}C_{3n}$

Answer: a



Watch Video Solution

6. If $(1+x)^{10} = a_0 + a_1x + a_2x^2 + \dots + a_{10}x^{10}$, then value of $(a_0 - a_2 + a_4 - a_6 + a_8 - a_{10})^2 + (a_1 - a_3 + a_5 - a_7 + a_9)^2$ is

A. 2^9

B. 3^9

C. 2^{10}

D. 3^{10}

Answer: c



Watch Video Solution

7. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$, then

the sum $C_0 + (C_0 + C_1) + \dots + (C_0 + C_1 + \dots + C_{n-1})$ is equal to

A. $n \cdot 2^n$

B. $n \cdot 2^{n-1}$

C. $n \cdot 2^{n-2}$

D. $n \cdot 2^{n-3}$

Answer: b



Watch Video Solution

8. $\frac{C_0}{1 \cdot 3} - \frac{C_1}{2 \cdot 3} + \frac{C_2}{3 \cdot 3} - \frac{C_3}{4 \cdot 3} + \dots + (-1)^n \frac{C_n}{(n+1) \cdot 3}$ is

A. $\frac{3}{n+1}$

B. $\frac{n+1}{3}$

C. $\frac{1}{3(n+1)}$

D. None of these

Answer: c

 [Watch Video Solution](#)

9. The value of $\binom{50}{0}\binom{50}{1} + \binom{50}{1}\binom{50}{2} + \dots + \binom{50}{49}\binom{50}{50}$

is

A. $\binom{100}{50}$

B. $\binom{100}{51}$

C. $\binom{50}{25}$

D. $\binom{50}{25}^2$

Answer: b

 [Watch Video Solution](#)

10. If $C_r = {}^n C_r$ then $\frac{C_1}{2} - \frac{C_2}{3} + \frac{C_3}{4} - \dots - \frac{C_{100}}{101}$ is equal to

A. C_1

B. C_2

C. C_3

D. C_4

Answer: b



Watch Video Solution

11. The sum $\sum_{r=0}^n (r+1)(C_r)^2$ is equal to :

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

B. $\frac{(n+2)(2n+1)!}{n!(n-1)!}$

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

D. $\frac{(n+2)(2n-1)!}{n!(n+1)!}$

Answer: a



Watch Video Solution

12. $\sum_{r=1}^n \left\{ \sum_{r_1=0}^{r-1} {}^n C_r {}^r C_{r_1} 2^{r_1} \right\}$ is equal to

A. $4^n - 3^n + 1$

B. $4^n - 3^n - 1$

C. $4^n - 3^n + 2$

D. $4^n - 3^n$

Answer: d



Watch Video Solution

13. Solve the given equation $3x^2 - x - 1 = 0$



Watch Video Solution

14. Solve the equation $x^2 + x + \frac{1}{2} = 0$



Watch Video Solution

Exercise Single Option Correct Type Questions

1.

$$\sum_{r=0}^n (-1)^r \cdot {}^n C_r \left[\frac{1}{2^r} + \frac{3}{2^{2r}} + \frac{7}{2^{3r}} + \frac{15}{2^{4r}} + \dots \text{m terms} \right] = \frac{2^{mn} - 1}{2^{mn}(2^n - 1)}$$

A. -6

B. -3

C. 3

D. Cannot be determined

Answer: d



Watch Video Solution

2. The coefficient of $(x^3 \cdot b^6 \cdot C^8 \cdot d^9 \cdot e \cdot f)$ in the expansion of $(a + b + c - d - e - f)^{31}$ is

A. 12632

B. 23110

C. 3110

D. None of these

Answer: d



Watch Video Solution

3. Find the number of rational terms and also find

the sum of rational terms in $(\sqrt{2} + \sqrt[3]{3} + \sqrt[6]{5})^{10}$

A. 12632

B. 1260

C. 126

D. None of these

Answer: a



[Watch Video Solution](#)

4. If $(1 + x - 3x^2)^{2145} = a_0 + a_1x + a_2x^2 + \dots$ then $a_0 - a_1 + a_2 - \dots$ ends with

A. 1

B. 3

C. 7

D. 9

Answer: b



[Watch Video Solution](#)

5. In the expansion of $\left(\sqrt{\frac{q}{p}} + \sqrt[10]{\frac{p^7}{q^3}}\right)^n$, there is a term similar to pq , then that term is equal to

- A. $45pq$
- B. $120pq$
- C. $210pq$
- D. $252pq$

Answer: d

 [Watch Video Solution](#)

6. Solve the quadratic equation

$$x^2 - 5x + 10 = 0$$

 [Watch Video Solution](#)

7. Solve the inequalities and represent the solution graphically on number line : $4x + 2 > -18$, $4x - 2 < 18$



[Watch Video Solution](#)

8. If the number of terms in $\left(x + 2 + \frac{1}{x}\right)^n$ ($n \in I^+$ is 401, then n is greater than

A. 201

B. 200

C. 199

D. None of these

Answer: d



[Watch Video Solution](#)

9. The value of $\sum_{r=0}^{n-1} \left(\frac{C_r}{{}^nC_r + {}^nC_{r+1}} \right)$ is equal to

A. $\frac{n}{2}$

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

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

D. $\frac{n(n-1)}{2(n+1)}$

Answer: a



Watch Video Solution

10. The largest term in the expansion of $\left(\frac{b}{2} + \frac{b}{2} \right)^{100}$ is

A. b^{100}

B. $\left(\frac{b}{2} \right)^{100}$

C. ${}^{100}C_{50} \left(\frac{b}{2} \right)^{100}$

D. ${}^{100}C_{50} b^{100}$

Answer: c



Watch Video Solution

11. Solve the following quadratic equation

$$4x^2 - 1 = 0$$



Watch Video Solution

12. The coefficient of x^m in

$$(1+x)^m + (1+x)^{m+1} + \dots + (1+x)^n, m \leq n$$
 is

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

B. ${}^{n-1}C_{m-1}$

C. nC_m

D. ${}^nC_{m+1}$

Answer: a

 [Watch Video Solution](#)

13. The number of values of 'r' satisfying the equation

$${}^{39}C_{3r-1} - {}^{39}C_{r^2} = {}^{39}C_{r^2-1} - {}^{39}C_{3r} \text{ is}$$

A. 1

B. 2

C. 3

D. 4

Answer: b

 [Watch Video Solution](#)

14. The sum $S = {}^{20}C_2 + 2 \cdot {}^{20}C_3 + 3 \cdot {}^{20}C_4 + \dots + 19 \cdot {}^{20}C_{20}$ is equal to

A. $1 + 5 \cdot 2^{20}$

B. $1 + 2^{21}$

C. $1 + 9 \cdot 2^{20}$

D. 2^{20}

Answer: c



Watch Video Solution

15. The remainder, if $1 + 2 + 2^2 + \dots + 2^{1999}$ is divided by 5 is.

A. 0

B. 1

C. 2

D. 3

Answer: a



Watch Video Solution

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

$\frac{n!}{(n-1)!(n+1)!}$ (b). $\frac{(2n)!}{(n-1)!(n+1)!}$ (c). $\frac{(2n)!}{(2n-1)!(2n+1)!}$ (d).

none of these

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

B. $\frac{2n!}{(n-1)!(n+1)!}$

C. $\frac{n!}{(2n-1)!(1n+1)!}$

D. $\frac{2n!}{(2n-1)!(1n+1)!}$

Answer: b



Watch Video Solution

17. The last two digits of the number 19^{94} is

A. 19

B. 29

C. 39

D. 81

Answer: a



Watch Video Solution

18. If the second term of the expansion $\left[a^{\frac{1}{13}} + \frac{a}{\sqrt{a^{-1}}} \right]^n$ is $14a^{5/2}$, then the value of $\frac{{}^n C_3}{{}^n C_2}$ is.

A. 19

B. 29

C. 39

D. 81

Answer: a



Watch Video Solution

19. If $6^{83} + 8^{83}$ is divided by 49, the remainder is

A. 0

B. 14

C. 35

D. 42

Answer: c



[Watch Video Solution](#)

20. The sum of all rational terms in the expansion of

$$\left(3^{1/4} + 4^{1/3}\right)^{12} \text{ is}$$

A. 91

B. 251

C. 273

D. 283

Answer: d



[Watch Video Solution](#)

21. Sum of last three digits of the number $N = 7^{100} - 3^{100}$ is.

A. 2000

B. 4000

C. 6000

D. 8000

Answer: d



[Watch Video Solution](#)

22. If 5^{99} is divided by 13, the remainder is

A. 2

B. 4

C. 6

D. 8

Answer: d



[Watch Video Solution](#)

23. Find the value of $\{3^{2003} / 28\}$, where $\{.\}$ denotes the fractional part.

A. $17/28$

B. $19/28$

C. $23/28$

D. $2/28$

Answer: b



[Watch Video Solution](#)

24. The value of $\sum_{r=0}^{20} r(20-r) \binom{20}{r}^2$ is equal to $400^{39} C_{20}$ b. $400^{40} C_{19}$ c. $400^{39} C_{19}$ d. $400^{38} C_{20}$

A. $400^{37} C_{20}$

B. $400^{40} C_{19}$

C. $400^{38} C_{19}$

D. $400^{38} C_{20}$

Answer: d



[Watch Video Solution](#)

25. Find the roots of the following quadratic equation

$$x^2 + x - 1 = 0$$



[Watch Video Solution](#)

26. The total number of terms which are dependent on the value of x in the expansion of $\left(x^2 - 2 + \frac{1}{x^2}\right)^n$ is equal to $2n + 1$ b. $2n$ c. n d. $n + 1$

A. $2n + 1$

B. $2n$

C. $n + 1$

D. n

Answer: b



[Watch Video Solution](#)

27. The coefficient of x^{10} in the expansion of $(1 + x^2 - x^3)^8$ is 476 b. 496
c. 506 d. 528

A. 420

B. 476

C. 532

D. 588

Answer: b



[Watch Video Solution](#)

28. The number of real negative terms in the binomial expansion of

$(1 + ix)^{4n-2}$, $n \in N$, $x > 0$ is *n* b. $n + 1$ c. $n - 1$ d. $2n$

A. *n*

B. $n + 1$

C. $n - 1$

D. $2n$

Answer: a



[Watch Video Solution](#)

29. $\sum_{p=1}^n \sum_{m=p}^n \binom{n}{m} \binom{m}{p}$ is equal to

A. (a) 3^n

B. (b) 2^n

C. (c) $3^2 + 2^n$

D. (d) $3^n - 2^n$

Answer: d



Watch Video Solution

30. The largest real value of x, such that

$$\sum_{r=0}^4 \left(\frac{5^{4-r}}{(4-r)!} \right) \left(\frac{x^r}{r!} \right) = \frac{8}{3} \text{ is}$$

A. $2\sqrt{2} - 5$

B. $2\sqrt{2} + 5$

C. $-2\sqrt{3} - 5$

D. $-2\sqrt{2} + 5$

Answer: a



[Watch Video Solution](#)

Exercise More Than One Correct Option Type Questions

1. If in the expansion of $(1 + x)^m(1 - x)^n$, the coefficients of x and x^2 are 3 and -6 respectively, the value of m and n are

A. 3

B. 6

C. 9

D. 12

Answer: c,d



[Watch Video Solution](#)

2. If the coefficients of r th, $(r + 1)$ th, and $(r + 2)$ th terms in the expansion of $(1 + x)^{14}$ are in A.P., then r is/are a. 5 b. 11 c. 10 d. 9

A. 5

B. 9

C. 10

D. 12

Answer: a,b



Watch Video Solution

3. If n is a positive integer and $(3\sqrt{3} + 5)^{2n+1} = l + f$ where l is an integer and $0 < f < 1$, then

A. α is an even integer

B. $(\alpha + \beta)^2$ is divisible by 2^{2n+1}

C. the integer just below $(3\sqrt{3} + 5)^{2n+1}$ is divisible by 3

D. α is divisible by 10

Answer: a,d



Watch Video Solution

4. If $(8 + 3\sqrt{7})^n = P + F$, where P is an integer and F is a proper fraction, then

A. P is an odd integer

B. P is an even integer

C. $F(P + F) = 1$

D. $(1 - F)(P + F) = 1$

Answer: a,d



Watch Video Solution

5. The value of x for which the sixth term in the expansion of

$$\left[2^{\log_2 2 \sqrt{9^{x-1} + 7}} + \frac{1}{2^{\frac{1}{5}} (\log_2 (3^{(x-1)+1}))} \right]^7$$

is 84 is a. 4 b. 1 or 2 c.

0 or 1 d. 3

A. 4

B. 3

C. 2

D. 1

Answer: c,d



Watch Video Solution

6. Consider the binomial expansion of $\left(\sqrt{x} + \left(\frac{1}{2x^{\frac{1}{4}}} \right) \right)^n$ $n \in \mathbb{N}$, where

the terms of the expansion are written in decreasing powers of x . If the coefficients of the first three terms form an arithmetic progression then the statement(s) which hold good is(are)

- A. (A) Total number of terms in the expansion of the binomial is 8
- B. (B) Number of terms in the expansion with integral power of x is 3
- C. (C) There is no term in the expansion which is independent of x
- D. (D) Fourth and fifth are the middle terms of the expansion

Answer: b,c

 [Watch Video Solution](#)

7. Let $(1 + x^2)^2(1 + x)^n = a_0 + a_1x + a_2x^2 + \dots$ if

a_0, a_1 and a_2 are in A.P, the value of n is

- A. 2
- B. 3
- C. 4
- D. 7

Answer: b,c

 [Watch Video Solution](#)

8. Solve the equation $x^2 - 2x + \frac{3}{2} = 0$

 [Watch Video Solution](#)

9. Find the roots of the following quadratic equation
 $27x^2 - 10x + 1 = 0$

 [Watch Video Solution](#)

10. If $f(n) = \sum_{i=0}^n \binom{30}{30-i} \binom{20}{30-i}$, then

 [Watch Video Solution](#)

11. Find the value (s) of r satisfying the equation
 ${}^{69}C_{3r-1} - {}^{69}C_{r^2} = {}^{69}C_{r^2-1} - {}^{69}C_{3r}$.

A. 1

B. 2

C. 3

D. 7

Answer: c,d



Watch Video Solution

12. If the middle term of $\left(x + \frac{1}{x} \sin^{-1} x\right)^8$ is equal to $\frac{630}{16}$,

the value of x is/are

A. $-\frac{\pi}{3}$

B. $-\frac{\pi}{6}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{3}$

Answer: a,d



Watch Video Solution

13. If $ac < b^2$ then the sum of the coefficient in the expansion of $(a\alpha^2x^2 + 2b\alpha x + c)^n$ is ($a, b, c, \alpha \in R$ and $n \in N$)

A. (a)+ve, if $a > 0$

B. (b)+ve, if $c > 0$

C. (c)-ve, if $a < 0$, n is odd

D. (d)+ve, if $c < 0$, n is even

Answer: a,b,c,d



Watch Video Solution

14. Find the value of m if $\left(\frac{1+i}{1-i}\right)^m = 1$



Watch Video Solution

15.

Prove

that

$$(x^2 + y^2)(z^2 + w^2) = X^2 + Y^2 \quad \text{if} \quad (x + iy)(z + iw) = X + iY$$


[Watch Video Solution](#)

Exercise Passage Based Questions

1. Find the value of x if $|3 - 4i| = 5^x$


[Watch Video Solution](#)

2. Consider $(1 + x + x^2)^n = \sum_{r=0}^{2n} a_r x^r$, where $a_0, a_1, a_2, \dots, a_{2n}$ are real number and n is positive integer.

If n is even, the value of $\sum_{r=0}^{\frac{n}{2}-1} a_{2r}$ is

A. $\frac{3^n - 1 + a_n}{2}$

B. $\frac{3^n - 1 - a_n}{4}$

C. $\frac{3^n + 1 + a_n}{2}$

D. $\frac{3^n + 1 - 2a_n}{4}$

Answer: d



Watch Video Solution

3. Consider $(1 + x + x^2)^n = \sum_{r=0}^n a_r x^r$, where $a_0, a_1, a_2, \dots, a_{2n}$ are real number and n is positive integer.

The value of $\sum_{r=0}^{n-1} a_r$ is

A. $\frac{3^n - 1 + 2a_n}{2}$

B. $\frac{3^n - 1 + 2a_n}{4}$

C. $\frac{3^n + 1 + 2n_n}{2}$

D. $\frac{3^n + 1 - 2a_n}{4}$

Answer: b



Watch Video Solution

4. If $(1 + x - 2x^2)^{20} = \sum_{r=0}^{40} a_r x^r$, then find

the value of $a_1 + a_3 + a_5 + \dots + a_{39}$.

A. $2^{19}(2^{19} - 1)$

B. $2^{20}(2^{19} - 1)$

C. $2^{19}(2^{20} - 1)$

D. $2^{20}(2^{20} - 19)$

Answer: c



Watch Video Solution

5. If $(1 + x - 2x^2)^{20} = \sum_{r=0}^{40} a_r x^r$, then find

the value of $a_1 + a_3 + a_5 + \dots + a_{39}$.

A. $2^{19}(2^{19} - 20)$

B. $2^{19}(2^{20} - 21)$

C. $2^{19}(2^{19} - 21)$

D. $2^{19}(2^{19} - 19)$

Answer: b

 [Watch Video Solution](#)

6. Find the modulus of the complex number $\frac{2 + 3i}{2 - 3i}$

 [Watch Video Solution](#)

7. If a is the remainder when 5^{40} is divided by 11 and b is the remainder when 2^{2011} is divided by 17, the value of a + b is

A. 7

B. 8

C. 9

D. 10

Answer: c



[Watch Video Solution](#)

8. Suppose m divided by n , then quotient q and remainder r

or $m = nq + r, \forall m, n, q, r \in \mathbb{Z}$ and $n \neq 0$

If 13^{99} is divided by 81, the remainder is

A. (a)13

B. (b)23

C. (c)39

D. (d)55

Answer: d



[Watch Video Solution](#)

9. Suppose m divided by n , then quotient q and remainder r

$$\text{or } m = nq + r, \forall m, n, q, r \in \mathbb{Z} \text{ and } n \neq 0$$

If 13^{99} is divided by 81, the remainder is

A. 13

B. 23

C. 39

D. 55

Answer: d



[Watch Video Solution](#)

10. Consider the binomial expansion of $R = (1 + 2x)^n = I + f$, where I

is the integral part of R and f is the fractional part of R , $n \in \mathbb{N}$.

Also, the sum of coefficient of R is 2187.

The value of $(n + Rf)$ for $x = \frac{1}{\sqrt{2}}$ is

A. 7

B. 8

C. 9

D. 10

Answer: b



Watch Video Solution

11. Consider the binomial expansion of $R = (1 + 2x)^n = I + f$, where I is the integral part of R and f is the fractional part of R , $n \in \mathbb{N}$.

Also, the sum of coefficients of R is 2187.

If i th term is the greatest term for $x = \frac{1}{3}$, then i equal

A. 4

B. 5

C. 6

D. 7

Answer: a



[Watch Video Solution](#)

12. Consider the binomial expansion of $R = (1 + 2x)^n = I + f$, where I is the integral part of R and f is the fractional part of R , $n \in \mathbb{N}$.

Also, the sum of coefficient of R is 2187.

If k th term is having greatest coefficient, the sum of all possible value of k , is

A. 7

B. 9

C. 11

D. 13

Answer: b



[Watch Video Solution](#)

13. If $(x + a_1)(x + a_2)(x + a_3) \dots (x + a_n) =$

$$x^n + S_1x^{n-1} + S_2x^{n-2} + \dots + S_n$$

where $S_1 = \sum_{i=1}^n a_i$, $S_2 = \left(\sum \sum \right)_{1 \leq i < j \leq n} a_i a_j$,

$$S_3 \left(\sum \sum \sum \right)_{1 \leq i < j < k \leq n} a_i a_j a_k$$

and so on .

Coefficient of x^7 in the expansion of

$$(1 + x)^2(3 + x)^3(5 + x)^4 \text{ is}$$

A. $n \cdot 2^n$

B. $(n + 1) \cdot 2^n$

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

D. $n \cdot 2^n + 1$

Answer: b



Watch Video Solution

14. Find the value of $\left| \frac{1+i}{1-i} \right|$

A.

B.

C.

D.

Answer: b



Watch Video Solution

15. If $(x + a_1)(x + a_2)(x + a_3) \dots (x + a_n) =$

$$x^n + S_1x^{n-1} + S_2x^{n-2} + \dots + S_n$$

where $S_1 = \sum_{i=1}^n a_i$, $S_2 = \left(\sum \sum \right)_{1 \leq i < j \leq n} a_i a_j$,

$$S_3 \left(\sum \sum \sum \right)_{1 \leq i < j < k \leq n} a_i a_j a_k$$

and so on .

Coefficient of x^7 in the expansion of

$$(1 + x)^2(3 + x)^3(5 + x)^4 \text{ is}$$

A. 112

B. 224

C. 342

D. 416

Answer: d



Watch Video Solution

16. $A = \left(\frac{5}{2} + \frac{x}{2}\right)^n$, $B = (1 + 3x)^m$

Sum of coefficients of expansion of B is 6561 . The difference of the coefficient of third to the second term in the expansion of A is equal to 117 .

The value of m is

A. 4

B. 5

C. 6

D. 7

Answer: c



Watch Video Solution

$$17. B = \left(\frac{5}{2} + \frac{x}{2} \right)^n, A = (1 + 3x)^m$$

Sum of coefficients of expansion of B is 6561 . The difference of the coefficient of third to the second term in the expansion of A is equal to 117 .

If n^m is divided by 7 , the remainder is

- A. 1
- B. 2
- C. 3
- D. 5

Answer: a



Watch Video Solution

18. Sum of coefficients of expansion of B is 6561 . The difference of the coefficient of third to the second term in the expansion of A is equal to 117 .

The ratio of the coefficient of second term from the beginning and the end in the expansion of B , is

- A. 125
- B. 625
- C. 3125
- D. 15625

Answer: d

 [Watch Video Solution](#)

19. Let us consider the binomial expansion $(1 + x)^n = \sum_{r=0}^n a_r x^r$

where a_4, a_5 and a_6 are in AP , ($n < 10$). Consider another

binomial expansion of $A = \sqrt[3]{2} + (\sqrt[4]{3})^{13n}$, the expansion of A

contains some rational terms $T_{a_1}, T_{a_2}, T_{a_3}, \dots, T_{a_m}$

$$(a_1 < a_2 < a_3 < \dots < a_m)$$

The value of a_m is

A. 63

B. 127

C. 255

D. 511

Answer: b



Watch Video Solution

20. Let us consider the binomial expansion $(1 + x)^n = \sum_{r=0}^n a_r x^r$

where a_4, a_5 and a_6 are in AP, ($n < 10$). Consider another

binomial expansion of $A = \sqrt[3]{2} + (\sqrt[4]{3})^{13n}$, the expansion of A

contains some rational terms $T_{a_1}, T_{a_2}, T_{a_3}, \dots, T_{a_m}$

$$(a_1 < a_2 < a_3 < \dots < a_m)$$

The value of a_m is

A. 87

B. 88

C. 89

D. 90

Answer: c

 [Watch Video Solution](#)

21. Let us consider the binomial expansion $(1 + x)^n = \sum_{r=0}^n a_r x^r$

where a_4, a_5 and a_6 are in AP, ($n < 10$). Consider another

binomial expansion of $A = \sqrt[3]{2} + (\sqrt[4]{3})^{13n}$, the expansion of A

contains some rational terms $T_{a_1}, T_{a_2}, T_{a_3}, \dots, T_{a_m}$

($a_1 < a_2 < a_3 < \dots < a_m$)

The value of a_m is

A. 6

B. 8

C. 10

D. 12

Answer: d



[Watch Video Solution](#)

Binomial Theorem Exercise 4 Single Integer Answer Type Questions

1. For integer $n > 1$, the digit at unit's place in the number

$$\sum_{r=0}^{100} r! + 2^{2^n} - 1$$



[Watch Video Solution](#)

Exercise Single Integer Answer Type Questions

1. If $(1 + x + x^2 + x^3)^n = \sum_{r=0}^{3n} b_r x^r$ and $\sum_{r=0}^{3n} b_r = k$, then $\sum_{r=0}^{3n} r b_r$ is

 [Watch Video Solution](#)

2. The number of rational terms in the expansion of

$$\left(\sqrt[3]{4} + \frac{1}{\sqrt[4]{6}} \right)^{20} \text{ is}$$

 [Watch Video Solution](#)

3. If $2^{2006} + 2006$ is divided by 7, the remainder is

 [Watch Video Solution](#)

4. The last two digits of the number 19^{94} is

 [Watch Video Solution](#)

5. If
$$\frac{{}^n C_r + 4 \cdot {}^n C_{r+1} + 6 \cdot {}^n C_{r+2} + 4 \cdot {}^n C_{r+3} + {}^n C_{r+4}}{[{}^n C_r + 3 \cdot {}^n C_{r+1} + 3 \cdot {}^n C_{r+2} + {}^n C_{r+3}]} = \frac{n + \lambda}{r + \lambda}$$

the value of λ is



Watch Video Solution

6. The value of $99^{50} - 99.98^{50} + \frac{99 \cdot 98}{1 \cdot 2} (97)^{50} - \dots + 99$ is



Watch Video Solution

7. If the greatest term in the expansion of $(1 + x)^{2n}$ has the greatest coefficient if and only if $x \in \left(\frac{10}{11}, \frac{11}{10} \right)$ and the fourth term in the expansion of $\left(kx + \frac{1}{x} \right)^m$ is $\frac{n}{4}$ then find the value of mk .



Watch Video Solution

8. Express the given complex number in the form $a + ib$: $(3 - i4)^2$



Watch Video Solution

9. Find the real and imaginary part of $\frac{4 + 5i}{2 - 3i}$



[Watch Video Solution](#)

Binomial Theorem Exerciese 5 Matching Type Questions

1. Find the real and imaginary part of $\frac{3 - 4i}{1 + i}$



[Watch Video Solution](#)

2. Find real and imaginary part of $\frac{2 + i6}{12}$



[Watch Video Solution](#)

3. Solve the given inequality for real : $4(x - 2) \leq 2(x - 5)$



[Watch Video Solution](#)

4. Solve the given inequality for real : $3(1 - x) \leq 6(2 - x)$



Watch Video Solution

5. Solve the given inequality for real x : $(1 - x) \geq (3 - 2x)$



Watch Video Solution

Exercise Statement I And II Type Questions

1. Statement-1 Greatest coefficient in the expansion of

$$(1 + 3x)^6 \text{ is } {}^6C_3 \cdot 3^3.$$

Statement-2 Greatest coefficient in the expansion of

$$(1 + x)^{2n} \text{ is the middle term.}$$

A. Statement I is True, Statement II is True, Statement II is a correct explanation for statement I

B. Statement I is True, Statement II is True, Statement II is NOT a correct explanation for Statement I

C. Statement I is True, Statement II is False

D. Statement I is False, Statement II is True.

Answer: d

 [Watch Video Solution](#)

2. Statement-1 The term independent of x in the

expansion of $\left(x^2 + \frac{1}{x^2} + 2\right)^{25}$ is ${}^{50}C_{25}$.

Statement-2 In a binomial expansion middle term is independent of x .

 [Watch Video Solution](#)

3. Statement-I : In the expansion of $(1+x)^n$ if coefficient of 31^{st} and 32^{nd} terms are equal then $n = 61$ Statement -II : Middle term in the expansion of $(1+x)^n$ has greatest coefficient.



[Watch Video Solution](#)

4. Statement-1 The number of terms in the expansion of

$$\left(x + \frac{1}{x} + 1\right)^n \text{ is } (2n + 1)$$

Statement-2 The number of terms in the expansion of

$$(x_1 + x_2 + x_3 + \dots + x_m)^n \text{ is } {}^{n+m-1}C_{m-1}.$$



[Watch Video Solution](#)

5. Statement-1 4^{101} when divided by 101 leaves the remainder 4.

Statement-2 $(n^p - n)$ when divided by 'p' leaves

remainder zero when $n \geq 2, n \in \mathbb{N}$ is a prime number .



[Watch Video Solution](#)

6. Statement-1: $11^{25} + 12^{25}$ when divided by 23 leaves the remainder zero.

Statement-2: $a^n + b^n$ is divisible by $(a + b)$ for all values of natural

number n



Watch Video Solution

7. Statement- 1 The maximum value of the term

independent of x in the expansion of $(ax^{1/6} + bx^{1/3})^9$ is 84

Statement- $2a^2 + b = 2$



Watch Video Solution

Exercise Subjective Type Questions

1. If the third term in the expansion of $\left(\frac{1}{x} + {}_x(\log)_{10}x\right)^5$ is 1000, then find x .



Watch Video Solution

2. Find the value of

$$18^3 + 7^3 + 3 \times 18 \times 7 \times 25$$

$$3^6 + 6 \times 243 \times 2 + 15 \times 81 \times 4 + 20 \times 27 \times 8 + 15 \times 9 \times 16 + 6 \times 3 \times \dots$$

 [Watch Video Solution](#)

3. Determine the term independent of a in the expansion of

$$\left(\frac{a+1}{a^{\frac{2}{3}} - a^{\frac{1}{3}} + 1} - \frac{a-1}{a - a^{\frac{1}{2}}} \right)^{10}$$

 [Watch Video Solution](#)

4. If in the expansion of $(1+x)^n$, a, b, c are three consecutive coefficients, then $n =$ a. $\frac{ac + ab + bc}{b^2 + ac}$ b. $\frac{2ac + ab + bc}{b^2 - ac}$ c. $\frac{ab + ac}{b^2 - ac}$ d.

none of these

 [Watch Video Solution](#)

5. $\left(\frac{2^1}{3} + \frac{1}{3^1}/3\right)^n$ if the ratio of 7th term from the beginning to the 7th term from the end is $\frac{1}{6}$, then find the value of n

 [Watch Video Solution](#)

6. if $S_n = C_0C_1 + C_1C_2 + \dots + C_{n-1}C_n$ and $\frac{S_{n+1}}{S_n} = \frac{15}{4}$ then n is

 [Watch Video Solution](#)

7. $\frac{C_1}{C_0} + 2\frac{C_2}{C_1} + 3\frac{C_3}{C_2} + \dots + n\frac{C_n}{C_{n-1}} = \frac{n(n+1)}{2}$

 [Watch Video Solution](#)

8. Find the term in $\left(3\sqrt{\frac{a}{b}} + 3\left(\sqrt{\frac{b}{\sqrt{a}}}\right)^{21}$ which has the same power of a and b .

 [Watch Video Solution](#)

9. The coefficient of x^r [$0 \leq r \leq (n-1)$] in the expansion of $(x+3)^{n-1} + (x+3)^{n-2}(x+2) + (x+3)^{n-3}(x+2)^2 + \dots + (x+2)^{n-1}$ is

a. ${}^n C_r (3^r - 2^n)$

b. ${}^n C_r (3^{n-r} - 2^{n-r})$

c. ${}^n C_r (3^r + 2^{n-r})$

d. none of these



Watch Video Solution

10. Prove that if p is a prime number greater than 2,

then the difference $\left[(2 + \sqrt{5})^p \right] - 2^{p+1}$ is divisible by p , where $[.]$ denotes greatest integer.



Watch Video Solution

11. Integer just greater than $(\sqrt{3} + 1)^{2n}$ is necessarily divisible by

A. (A) $n + 2$

B. (B) 2^{n+3}

C. (C) 2^n

D. (D) 2^{n+1}

Answer:

 [Watch Video Solution](#)

12. Find the solution of the following inequality $6 < 2x + 4 < 10$

 [Watch Video Solution](#)

13. If $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$,

find the values of the following

$$\sum_{0 \leq i < j \leq n} (i + j)(C_i \pm C_j)^2$$

 [Watch Video Solution](#)

14. Solve the given inequality and show the graph of the solution on number line $6x - 2 \leq 2x + 2$

 [Watch Video Solution](#)

15. Find the coefficient of x^4 in the expansion of $(1 + x + x^2 + x^3)^{11}$.

 [Watch Video Solution](#)

16. Find the coefficient of x^4 in the expansion of $(2 - x + 3x^2)^6$.

 [Watch Video Solution](#)

17. If for z as real or complex,

$$(1 + z^2 + z^4)^8 = C_0 + C_1z^2 + C_2z^4 + \dots + C_{16}z^{32} \text{ then}$$

A. (a) $C_0 - C_1 + C_2 - C_3 + \dots + C_{16} = 1$

B. (b) $C_0 + C_3 + C_6 + C_9 + C_{12} + C_{15} = 3^7$

C. (c) $C_2 + C_5 + C_6 + C_{11} + C_{14} = 3^6$

D. (d) $C_1 + C_4 + C_7 + C_{10} + C_{13} + C_{16} = 3^7$

Answer:



[Watch Video Solution](#)

18. Find the solution of the given inequality for real x $\frac{x}{3} > \frac{x}{2} + 1$



[Watch Video Solution](#)

19. Find the solution of the given inequality for real x : $\frac{x}{2} + \frac{x}{3} < 5$



[Watch Video Solution](#)

20. Find the solution of the following inequality for real x :

$$7x + 3 \geq 4x - 3$$



[Watch Video Solution](#)

21. Solve the inequality $2 \leq 2x - 6 \leq 4$



[Watch Video Solution](#)

22. Solve the inequality $6 \leq 2x - 4 \leq 12$



[Watch Video Solution](#)

Binomial Theorem Exercise 7 Subjective Type Questions

1. Show that there will be a term independent of x in the expansion of $(x^a + a^{-b})^n$ only, if n is a multiple of $(a+b)$.



[Watch Video Solution](#)

2. Solve the given inequality and show the graph of the solution on number line $5x - 3 \leq 4x - 6$

 [Watch Video Solution](#)

3. Solve the given inequality and show the graph of the solution on number line $2x - 3 \leq 3x + 4$

 [Watch Video Solution](#)

4. Solve the inequality $4 \leq 3x - 2 \leq 10$

 [Watch Video Solution](#)

5. Show that $\frac{C_0}{1} - \frac{C_1}{4} + \frac{C_2}{7} - \dots + (-1)^n \frac{C_n}{3n+1}$
 $= \frac{3^n \cdot n!}{1 \cdot 4 \cdot 7 \dots (3n+1)}$, where C_r stands for ${}^n C_r$.

 [Watch Video Solution](#)

Exercise Questions Asked In Previous 13 Years Exam

1. The value of

$$\binom{30}{0}\binom{30}{10} - \binom{30}{1}\binom{30}{11} + \binom{30}{2}\binom{30}{12} + \dots + \binom{30}{20}\binom{30}{30}$$

A. ${}^{60}C_{20}$

B. ${}^{30}C_{10}$

C. ${}^{60}C_{30}$

D. ${}^{40}C_{30}$

Answer: B



[Watch Video Solution](#)

2. If the coefficient of the r th, $(r + 1)$ th and $(r + 2)$ th terms in the expansion of $(1 + x)^n$ are in A.P., prove that

$$n^2 - n(4r + 1) + 4r^2 - 2 = 0.$$



Watch Video Solution

3. If the coefficient of x^7 in $\left[ax^2 + \left(\frac{1}{b}x\right)\right]^{11}$ 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. 1

B. $1/2$

C. 2

D. 3

Answer: A



Watch Video Solution

4. For natural numbers

m, n , if $(1 - y)^m(1 + y)^n = 1 + a_1y + a_2y^2 + \dots$, and $a_1 = a_2 = 10$, then

is

A. (20,45)

B. (35,20)

C. (45,35)

D. (35,45)

Answer: D



Watch Video Solution

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

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

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

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

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

Answer: D

 [Watch Video Solution](#)

6. The sum of series ${}^{20}C_0 - {}^{20}C_1 + {}^{20}C_2 - {}^{20}C_3 + \dots + {}^{20}C_{10}$ is

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

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

C. 0

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

Answer: B

 [Watch Video Solution](#)

7. 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 true ,Statement-2 is true, Statement-2 is a correct

explanation for Statement-1

B. Statement-1 is true ,Statement-2 is true, Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true ,Statement-2 is false

D. Statement-1 is false ,Statement-2 is true

Answer: A

 [Watch Video Solution](#)

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

A. 8

B. 0

C. 2

D. 7

Answer: C

 [Watch Video Solution](#)

9. For $r = 0, 1, \dots, 10$, let A_r, B_r , and C_r denote, respectively, the coefficient of x^r in the expansion of $(1 + x)^{10}$, $(1 + x)^{20}$ and $(1 + x)^{30}$.

Then $\sum_{r=1}^{10} A_r(B_{10}B_r - C_{10}A_r)$ is equal to

A. $B_{10} - C_{10}$

B. $A_{10}(B_{10} - C_{10}A_{10})$

C. 0

D. $C_{10} - B_{10}$

Answer: D

 [Watch Video Solution](#)

10. Let $S_1 = \sum_{j=1}^{10} j(j-1) \cdot {}^{10}C_j$, $S_2 = \sum_{j=1}^{10} j \cdot {}^{10}C_j$, and $S_3 = \sum_{j=1}^{10} j^2 \cdot {}^{10}C_j$

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 a correct explanation for Statement-1
- B. Statement-1 is true ,Statement-2 is true, Statement-2 is not a correct explanation for Statement-1
- C. Statement-1 is true ,Statement-2 is false
- D. Statement-1 is false ,Statement-2 is true

Answer: B



[Watch Video Solution](#)

11. Find the coefficient of x^7 in the expansion of $(1 - x - x^2 + x^3)^6$.

A. -132

B. -144

C. 132

D. 144

Answer: B

 [Watch Video Solution](#)

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

A. an odd positive integer

B. an even positive integer

C. a rational number other than positive integer

D. an irrational number

Answer: D

 [Watch Video Solution](#)

13. The term independent of x in expansion of

$$\left(\frac{x+1}{x^{\frac{2}{3}} - x^{\frac{1}{3}} + 1} - \frac{x-1}{x - x^{\frac{1}{2}}} \right)^{10}$$
 is (1) 120 (2) 210 (3) 310 (4) 4

A. 120

B. 210

C. 310

D. 4

Answer: B



[Watch Video Solution](#)

14. The coefficients of three consecutive terms of $(1+x)^{n+5}$ are in the ratio 5:10:14. Then $n =$ _____.



[Watch Video Solution](#)

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

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

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

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

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

Answer: B



[Watch Video Solution](#)

16. Coefficient of x^{11} in the expansion of $(1 + x^2)^4(1 + x^3)^7(1 + x^4)^{12}$ is 1051 b. 1106 c. 1113 d. 1120

A. 1051

B. 1106

C. 1113

D. 1120

Answer: C



Watch Video Solution

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

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

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

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

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

Answer: B



Watch Video Solution

18. The coefficient of x^9 in the expansion of $(1+x)(16x^2)(1+x^3)(1+x^{100})$ is

 [Watch Video Solution](#)

19. 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 coefficient of all the terms in this expansion, is

- A. 243
- B. 729
- C. 64
- D. 2187

Answer: B

 [Watch Video Solution](#)

20. Let m be the smallest positive integer such that the coefficient of x^2 in the expansion of $(1+x)^2 + (1+x)^3 + \dots + (1+x)^{49} + (1+mx)^{50}$ is $(3n+1) \cdot {}^{51}C_3$ for some positive integer n , then the value of n is _____.

 [Watch Video Solution](#)

21. 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

 [Watch Video Solution](#)

