# MATHS

# BOOKS - NCERT MATHS (ENGLISH)

# BINOMIAL THEOREM

## Shrot Answer Type Question

**1.** Find the term independent of $x$, where $x \neq 0$, in the expansion of $\left(\frac{3x^2}{2} - \frac{1}{3x}\right)^{15}$.

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**2.** If the term free from $x$ in the expansion of $\left(\sqrt{x}-\frac{k}{x^2}\right)^{10}$ is $405$, find the value of $k$.

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**3.** Find the coefficient of $x$ in the expansion of $(1-3x+7x^2)(1-x)^{16}$.

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**4.** Find the term independent of $x$ in the expansion of $\left(3x - \frac{2}{x^2}\right)^{15}$.

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**5.** Find the middle term (terms) in the expansion of

(i) $\left(\frac{x}{a} - \frac{a}{x}\right)^{10}$ (ii) $\left(3x - \frac{x^3}{6}\right)^{9}$

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**6.** Find the coefficient of $x^{15}$ in the expansion of $\left(x - x^2\right)^{10}$

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**7.** The coefficient of $x^{-17}$ in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$ is

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**8.** Find the sixth term in the expansion $\left(y^{\frac{1}{2}}+x^{\frac{1}{3}}\right)^{n}$, if the binomial coefficient of the third term of the end is $45$.

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**9.** If the coefficients of (2r + 4)th, (r - 2)th terms in the expansion of $(1+x)^{18}$ are equal, find r.

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**10.** If the coefficient of 2nd, 3rd and 4th terms in the expansion of $(1+x)^{2n}$ are in A.P. , show that $2n^2 - 9n + 7 = 0$.

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

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## Long Answer Type Question

**1.** If p is a real number and the middle term in the expansion of $\left(\frac{p}{2}+2\right)^8$ is 1120, then find the value of p.

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**2.** Show that the middle term in the expansion $\left(x-\frac{1}{x}\right)^{2n}$ $is$ $\frac{1.3.5(2n-1)}{n}(-2)^n$.

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**3.** If the seventh term from the beginning and end in the binomial expansion of $\left(23+\frac{1}{33}\right)^n$, are equal, find $n$.

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**4.** If $o$ be the sum of odd terms and $E$ that of even terms in the expansion of $(x+a)^n$ prove that: $O^2-E^2=\left(x^2-a^2\right)^n$ (ii)

$4OE=(x+a)^{2n}-(x-a)^{2n}$ (iii)

$2\left(O^2+E^2\right)=(x+a)^{2n}+(x-a)^{2n}$

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**5.** If $x^p$ occurs in the expansion of $\left(x^2+1/x\right)^{2n}$, prove that its coefficient is $\frac{(2n)!}{\left[\frac{1}{3}(4n-p)\right]!\left[\frac{1}{3}(2n+p)\right]!}$.

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**6.** Find the term independent of $x$ in the expansion of $\left(1+x+2x^3\right)\left[\left(3x^2/2\right)-(1/3)\right]^9$

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## Objective Type Question

**1.** about to only mathematics

A. 50

B. 202

C. 51

D. None of these

**Answer: A**

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**2.** Given positive integers $r > 1, n > 2, n$ being even and the coefficient of $(3r)th$ term and $(r+2)th$ term in the expansion of $(1+x)^{2n}$ are equal; find r

A. $n = 2r$

B. $n = 3r$

C. $n = 2r + 1$

D. None of these

**Answer:**

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**3.** Find the two successive terms in the expansion of $(1+x)^{24}$ whose coefficients are in the ratio $1:4$.

A. 3rd and 4th

B. 4th and 5th

C. 5th and 6th

D. 6th and 7th

**Answer: C**

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**4.** Prove that the coefficient of $x^n$ in the expansion of $(1+x)^{2n}$ is twice the coefficient of $x^n$ in the expansion of $(1+x)^{2n-1}$

A. $1:2$

B. $1:3$

C. $3:1$

D. $2:1$

**Answer:**

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**5.** If the coefficients of 2nd, 3rd and 4th terms in the expansion of $(1+x)^n$ are in A.P., then find the value of n.

A. 2

B. 7

C. 11

D. 14

**Answer:**

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**6.** If A and B are the coefficients of $x^n$ in the expansion $(1+x)^{2n}$ and $(1+x)^{2n-1}$ respectively, then $\frac{A}{B}$ is

A. 1

B. 2

C. $\frac{1}{2}$

D. $\frac{1}{n}$

**Answer: B**

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**7.** If the middle term in the binomial expansion of $\left(\frac{1}{x} + x \sin x\right)^{10}$ is equal to $\frac{63}{8}$, find the value of $x$.

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

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

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

D. $n\pi + (-1)^n \frac{\pi}{3}$

**Answer: C**

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**8.** The largest coefficient in the expansion of $(1+x)^{30}$ is.....

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**9.** The number of terms in the expansion of $(a+b+c)^n, wheren \in N.$

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**10.** In the expansion of $\left(x^2 - \frac{1}{x^2}\right)^{16}$, the value of constant term is.....

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**11.** If the seventh, terms from the beginning and the end in the expansion of $\left(\sqrt[3]{2}+\frac{1}{\sqrt[3]{3}}\right)^{n}$ are equal, then n is equal to

(i) 10

(ii) 11

(iii) 12

(iv) 13

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**12.** The coefficient of $a^{-6}b^4$ in the expansion of $\left(\frac{1}{a}-\frac{2b}{3}\right)^{10}$ is.....

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**13.** Middle term in the expansion of $(a^3+ba)^{28}$ is .....

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**14.** 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.

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**15.** The position of the term independent of $x$ in the expansion of $\left(\sqrt{\frac{x}{3}}+\frac{3}{2x^2}\right)^{10}$ is .....

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**16.** If $25^{15}$ is divided by 13, then the remainder is .....

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## True False

**1.** The sum of the series $\Sigma_{r=0}^{10}{}^{20}C_r$ is $2^{19}+\frac{{}^{20}C_{10}}{2}$

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**2.** $7^9 + 9^7$ is divisible by (A) 16 (B) 24 (C) 64 (D) 72

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**3.** The number of term in the expansion of $\left[(2x + 3y)^4\right]^7$ is 8

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**4.** Find the sum of the coefficient of to middle terms in the binomial expansion of $(1+x)^{2n-1}$

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**5.** Write last two digits of the number $3^{400}$.

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**6.** If the expansion of $\left(x - \frac{1}{x^2}\right)^{2n}$ contains a term independent of x, then $n$ is a multiple of 2.

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**7.** The number of term is the expansion of $(a+b)^n$, where $n \in N$, is one less than the power $n$

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