



MATHS

BOOKS - OMEGA PUBLICATION

BINOMIAL THEOREM

Questions

1. Exapand: $\left(\frac{2}{x} - \frac{x}{2}\right)^5, x \neq 0$



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2. Find the value of $(0.99)^5$ upto three terms using binomial theorem.



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3. Using, Binomial theorem, evaluate $(101)^4$



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4. Using Binomial theorem, indicate which number is larger $(1.1)^{10000}$ or 1000.



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5. Find $(x + 1)^6 + (x - 1)^6$. Hence evaluate $(\sqrt{2} + 1)^6 + (\sqrt{2} - 1)^6$.



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6. Show that $9^{n+1} - 8n - 9$ is divisible by 64, whenever n is a positive integer.



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7. Prove that: $\sum_{r=0}^n 3^r C_r = 4^n$.



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8. Using Binomial theorem, prove that $6^n - 5n$ always leaves remainder 1 when divided by 25.



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9. Write the general term in the expansion of $(x^2 - yx)^{12}$, $x \neq 0$



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10. Find the middle terms in the expansion of

$$\left(3 - \frac{x^3}{6}\right)^7$$



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11. Find the middle terms in the expansion of

$$\left(\frac{x}{3} + ay\right)^{10}$$



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12. 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.



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13. Find the 13th term in the expansion of

$$\left(9x - \frac{1}{3\sqrt{x}} \right)^{18}$$



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14. Find the coefficient of a^5b^7 in $(a - 2b)^{12}$.



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



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16. The coefficients of three consecutive terms in the expansion of $(1 + a)^n$ are in the ratio 1 : 7 : 42. Find n



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17. The coefficients of the $(r - 1)^{th}$, r^{th} and $(r + 1)^{th}$ terms in the expansion of $(x + 1)^n$ are in the ratio 1 : 3 : 5. find n and r.



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Important Questions From Miscellaneous Exercise

1. If the coefficients of a^{r-1} , a^r , a^{r+1} in the binomial expansion of $(1+a)^n$ are in Arithmetic Progression, prove that:

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



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2. Find a , b and n in the expansion of $(a+b)^n$ if the first three terms of the expansion are

729, 7290 and 30375 respectively.



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3. Find the coefficient of x^5 in the product $(1 + 2x)^6(1 - x)^7$ using binomial theorem.



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



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5. If a and b are distinct integers, prove that $a - b$ is a factor of $a^n - b^n$, whenever n is a positive integer.



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6. Expand using binomial theorem

$$\left(1 + \frac{x}{2} - \frac{2}{x}\right)^4, x \neq 0$$



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7. Find the term independent of x in the

expansion of $\left(\sqrt[3]{x} + \frac{1}{2\sqrt[3]{x}}\right)^{18}$



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8. ਮੁੱਲ ਪਤਾ ਕਰੋ:-

$$\left(a^2 + \sqrt{a^2 - 1}\right)^4 + \left(a^2 - \sqrt{a^2 - 1}\right)^4$$



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9. Find the coefficient of x^5 in $(x + 3)^8$.



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Multiple Choice Questions Mcqs

1. The 4th term in the expansion of

$$\left(-x - \frac{1}{x}\right)^5 \text{ (for } x > 0\text{) is:}$$

A. independent of x

B. positive

C. negative

D. the only middle term.

Answer: C



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2. The coefficient of x^{-3} in the expansion of:

$$\left(x - \frac{m}{x}\right)^{11} \text{ is:}$$

A. $-924m^7$

B. $-792m^6$

C. $-330m^7$

D. $-792m^5$

Answer: C



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3. Constant term in the expansion of

$\left(x - \frac{1}{x}\right)^{10}$ is:

A. -252

B. 152

C. 252

D. -152

Answer: A



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4. The middle term of $\left(x + \frac{1}{x}\right)^{10}$ is:

A. ${}^{10}C_6$

B. ${}^{10}C_5$

C. ${}^{10}C_4$

D. none of these

Answer: B



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5. The number of non-zero terms in the expansion of $(1 + 3\sqrt{2}x)^9 + (1 - 3\sqrt{2}x)^9$ is:

A. 9

B. 0

C. 5

D. 10

Answer: C



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6. In the expansion of $(1 + x)^5$, the sum of the coefficients of the terms is:

A. 80

B. 16

C. 32

D. 64

Answer: C



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7. If ${}^{n+1}C_4 = 9^n C_2$, then $n=?$

A. 10

B. 9

C. 12

D. 11

Answer: D



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8. In the expansion of $(3x + 2)^4$, the coefficient of middle term is:

A. 81

B. 54

C. 216

D. 36

Answer: C



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9. If n is a positive integer, then the number of terms in the expansion of $(x + a)^n$ is:

A. n

B. $n+1$

C. infinitely many

D. nothing can be said

Answer: B



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10. In the expansion of $(1 + x)^n$, T_{r+1} is:

A. $C(n, r + 1)x^{n-1}$

B. $C(n, r)x^r$

C. $C(n, r)x^{n+1}$

D. $C(n, r - 1)x^{r+1}$

Answer: B



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11. For a positive integer

${}^n C_1 + {}^n C_2 + {}^n C_3 + \dots + {}^n C_n$ is equal to:

A. 2^n

B. $2^n - 1$

C. n^2

D. $n^2 - 1$

Answer: B



12. Thee fourth term in the expansion of $(x - 2y)^{12}$ is:

A. $1700x^9y^3$

B. $1620x^7y^5$

C. $-1760x^9y^3$

D. none of these

Answer: C



13. The value of

$${}^{13}C_2 + {}^{13}C_3 + {}^{13}C_4 + \dots + {}^{13}C_{13} \text{ is:}$$

A. $2^{13} - 13$

B. $2^{13} - 14$

C. an odd number $\neq 2^{13} - 12$

D. an even number $\neq 2^{13} - 14$

Answer: B



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14. The term independent of x in the expansion of $\left(2x - \frac{1}{2x^2}\right)^{12}$ is:

A. ${}^{-12}C_3 \cdot 26$

B. ${}^{-12}C_5 \cdot 2^2$

C. ${}^{12}C_6$

D. ${}^{12}C_4 \cdot 2^4$

Answer: D



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