CHAPTER 8

BINOMIAL THEOREM

DECEMBER 2020

1. a) $^nC_0 - {^nC_1} + {^nC_2} - {^nC_3} + \ldots + (-1)^n \, {^nC_n} = \ldots$

    a) 2^n b) 0

    c) 2^{n-1} d) 2 (1)

    b) Without expanding the expression, find the middle term of $\left(x^2 + \frac{1}{x}\right)^6$ (3)

MARCH 2020

2. a) Expand $\left(x + \frac{1}{x}\right)^6$ (2)

    b) Find the middle term in the expansion of $\left(\frac{x}{3} + 9y\right)^{10}$. (2)

IMPROVEMENT 2019

3. a) Number of terms in the expansion of $(x^2 - 2x + 1)^{20} = \ldots$ (1)

    b) Let $(1 + x)^n = {^nC_0}\,x + {^nC_1}\,x^2 + {^nC_2}\,x^3 + \ldots + {^nC_n}\,x^n$, the value of

    $= {^nC_0} + {^nC_1} + {^nC_2} + \ldots + {^nC_n} = \ldots$ (1)

    c) The coefficients of the $(r-1)^{th}, r^{th}$ and $(r+1)^{th}$ are in the ratio 1:7:42.

    Find n and r. (4)

MARCH 2019

4. a) Find $(a + b)^4 - (a - b)^4$. (2)

    b) Hence evaluate:

    $\left(\sqrt{3} + \sqrt{2}\right)^4 - \left(\sqrt{3} - \sqrt{2}\right)^4$. (2)

5. a) Find the general term in the expansion of $\left(x^2 + \frac{1}{x}\right)^5$. (2)

    b) If the expansion of $\left(x^2 + \frac{1}{x}\right)^n$ has a term

independent of x, then which of the following can be the value of n? (1)

i) 18 ii) 16 iii) 22 iv) 13

IMPROVEMENT 2018

6. a) Write the expansion of $(a + b)^n$. (1)

    b) Find the coefficient of $x^5 y^7$ in the expansion of $(x - 2y)^{12}$ (2)

    c) Show that $9^{n+1} - 8n - 9$ is divisible by 64. (3)

MARCH 2018

7. a) Which one of the following has its middle terms independent of x? (1)

    i) $\left(x + \frac{1}{x}\right)^{10}$ ii) $\left(x + \frac{1}{x}\right)^9$

    iii) $\left(x^2 + \frac{1}{x}\right)^9$ iv) $\left(x^2 + \frac{1}{x}\right)^{10}$

    b) Write the expansion of $\left(x^2 + \frac{3}{x}\right)^4$ (2)

    c) Determine whether the expansion of $\left(x^2 - \frac{2}{x}\right)^{18}$ a term containing x^{10}. (3)

IMPROVEMENT 2017

8. a) The number of terms in the expansion of $(x + a)^9 = \ldots$ (1)

    i) 9 ii) 10

    iii) 8 iv) 5

    b) Find $(a + b)^4 - (a - b)^4$ (2)

    c) Hence evaluate $\left(\sqrt{3} + \sqrt{2}\right)^4 - \left(\sqrt{3} - \sqrt{2}\right)^4$ (2)

MARCH 2017

9. Consider the expansion of $\left(x + \frac{1}{x}\right)^{10}$

    a) The number of terms in the expansion is …….

i) 10   ii) 9

iii) 11   iv) 12   (1)

b) Find the term which is independent of x in the above expansion.   (3)

IMPROVEMENT 2016

10. a) Write the expansion of $(a+b)^4$ (2)

    b) Evaluate: $\left(\sqrt{5}+\sqrt{6}\right)^4 + \left(\sqrt{5}-\sqrt{6}\right)^4$ (2)

MARCH 2016

11. a) The 8th terms is the expansion of $\left(\sqrt{2}+\sqrt{3}\right)^7$ is ……..

    i) $27\sqrt{2}$ ii) $27\sqrt{3}$

    iii) $72\sqrt{2}$ iv) $27\sqrt{3}$ (1)

    b) Find the term independent of x in the expansion of $\left(x+\dfrac{1}{2x}\right)^{18}; x>0$ (3)

IMPROVEMENT 2015

12. a) Number of terms in the expansion of $\left(x+\dfrac{1}{x}\right)^{20}$ is ……..

    i) 19   ii) 20

    iii) 21   iv) 22   (1)

    b) Consider the expansion of $\left(3x^2 - \dfrac{1}{3x}\right)^9$.

    Find the coefficient of x^6 and the term independent of x.   (4)

MARCH 2015

13. a) The number of terms in the expansion of $\left(x-\dfrac{1}{x}\right)^{2n}$ is …………...

i) $n+1$ ii) n

iii) $2n+1$ iv) $2n+2$ (1)

b) Find a, if the 17th term and 18th term of the expansion of $(2+\alpha)^{50}$ are equal.   (3)

IMPROVEMENT 2014

14. a) Write the expansion of $(a+b)^n$, where n is any positive integer.   (1)

    b) Find the value of $'\alpha'$ if the 17th term and 18th term in the expansion of $(2+a)^{50}$ are equal.   (4)

MARCH 2014

15. a) Write the number of terms in the expansion of $(a-b)^{2n}$ (1)

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

    c) Find the coefficient of $x^6 y^3$ in the expansion of $(x+2y)^9$ (2)

IMPROVEMENT 2013

16. a) The number of terms in the expansion of $\left(\dfrac{x}{3}+9y\right)^{10}$ is ……………   (1)

    b) Find the middle term in the above expansion.   (3)

MARCH 2013

17. a) Find the number of terms in the expansion of $\left(x-\dfrac{1}{x}\right)^{14}$ (1)

    b) Find the general term in the expansion of $\left(x-\dfrac{1}{x}\right)^{14}$ (2)

    c) Find the term independent of x in the above expansion.   (1)

IMPROVEMENT 2012

18. Find $(x+y)^4 - (x-y)^4$. Hence evaluate:

$(\sqrt{5}+\sqrt{6})^4 - (\sqrt{5}-\sqrt{6})^4$ (4)

MARCH 2012

19. a) Find the general term in the expansion of

$\left(\dfrac{x}{2} - \dfrac{2}{x}\right)^{10}$ (2)

   b) Find the term independent of x in the above expansion.   (2)

IMPROVEMENT 2011

20. Consider the expansion of $\left(x^3 + \dfrac{1}{x}\right)^8$

   a) Write the general term in the expansion.   (2)

   b) Find the coefficient of term containing x^8. (2)

MARCH 2011

21. Consider the expansion of $\left(\dfrac{x}{9} + 9y\right)^{2n}$

   i) The number of terms in the above expansion is …………

     a) 2n   b) n+1

     c) 2n+1   d) 2n−1   (1)

   ii) What is its (n+1)th term   (1)

   iii) If n = 5, Find its middle term.   (2)

IMPROVEMENT 2010

22. Consider the expansion of $\left(x^2 - \dfrac{1}{3x}\right)^9$

   a) Find the coefficient of x^9.   (2)

   b) Find the term which is independent of x.   (2)

MARCH 2010

23. i) Find the general term in the expansion of

$\left(3x^2 - \dfrac{1}{3x}\right)^9$ (2)

   ii) Find the term independent of x in the above expansion.   (2)

IMPROVEMENT 2009

24. a) Write the general term in the expansion of

$\left(\dfrac{3x^2}{2} - \dfrac{1}{3x}\right)^6$ (2)

   b) Find the term independent of x in the expansion of $\left(\dfrac{3x^2}{2} - \dfrac{1}{3x}\right)^6$ (2)

MARCH 2009

25. a) Write the general term in the expansion of

$(x^2 - y)^6$.   (2)

   b) Find the term independent of x in the

    expansion of $\left(\dfrac{3}{2}x^2 - \dfrac{1}{3x}\right)^6$ (2)

MARCH 2008

26. a) Using binomial theorem, find the expansion of

$(1+x)^a$ (1)

   b) Obtain the expansion for $\left(x^2 + \dfrac{2}{x}\right)^4$, where

    $x \neq 0$.   (2)

THOMAS EDISON

I will not say I failed 1000 times , I will say that I discovered there are 1000 ways that can cause failure - -