DAV PUBLIC SCHOOL, KALINGANAGAR, BHUBANESWAR

SUBJECT-MATHEMATICS, CLASS-XI
CHAPTER-8 (BINOMIAL THEOREM)
WORSHEET(BASIC)

Choose the correct option: (1 mark each)

1. The coefficient of x^5 in the expansion of $(x+3)^8$ is
   (a)1022 (b) 1512 (c) 1215 (d) 2210
2. The number of term in the expansion of $(a-2b)^{22}$ is
   (a) 21 (b) 24 (c) 23 (d) 20

Fill in the blanks: (1 mark each)

3. The 9th term in the expansion of $\left(\frac{x}{a}-\frac{3a}{x^2}\right)^{12}$ is ……..
4. If the fourth term in the expansion of $\left(ax+\frac{1}{x}\right)^n$ is $\frac{5}{2}$, then the value of n is ……

Answer the following: (1 mark each)

5. Write the general term in the expansion of $(3x-2y)^{12}$
6. Find the middle term in the expansion of $\left(3-\frac{x^3}{6}\right)^8$

Short Answer Type Question (2 marks each)

7. Find the middle terms in the expansion of $\left(2x^2-\frac{1}{x}\right)^7$
8. Find the term independent of x in the expansion of $\left(\frac{3}{2}x^2-\frac{1}{3x}\right)^6$

Long answer type question-I : (4 marks each)

9. Using binomial theorem prove that $9^{n+1}-8n-9$ is divisible by 64,whenever n is a positive integer.
10. Show that the middle term in the expansion of $(1+x)^{2n}$ is $\frac{1.3.5....(2n-1)}{n!}\,2n\,x^n$

Long answer type question-II : (6 marks each)

11. The second ,third and fourth terms in the binomial expansion $(x+a)^n$ are 240,720 and 1080,respectively.Find x ,a and n.
12. The coefficients of the $(r-1)^{th}$,r^{th} and $(r+1)^{th}$ terms in the expansion $(x+1)^n$ are in the ratio 1:3:5.Find n and r.

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SUBJECT-MATHEMATICS, CLASS-XI
CHAPTER-8 (BINOMIAL THEOREM)
WORSHEET(STANDARD)

Choose the correct option: (1 mark each)

1. If the coefficient of x^7 and x^8 in the expansion of $\left(2+\frac{x}{3}\right)^n$ are equal, then n is
   (a)56 (b) 55 (c) 45 (d) 15
2. The total number of term in the expansion of $(x+a)^{100}+(x-a)^{100}$ after simplification is
   (a) 50 (b) 202 (c) 51 (d) none of these

Fill in the blanks: (1 mark each)

3. The 4th term from end in the expansion of $\left(\frac{x^3}{2}-\frac{2}{x^2}\right)^9$ is ……..
4. Middle term in the expansion of $(a^3+ba)^{28}$ is …….

Answer the following: (1 mark each)

5. Find the r^{th} term in the expansion of $\left(x+\frac{1}{x}\right)^{2r}$.
6. Find the coefficient of x^{11} *in the expansion of* $\left(x^3-\frac{2}{x^2}\right)^{12}$

Short Answer Type Question (2 marks each)

7. Find the middle term(terms)in the expansion of $\left(\frac{p}{x}+\frac{x}{p}\right)^9$
8. If the coefficients of $(r-5)^{th}$ and $(2r-1)^{th}$ terms of the expansion of $(1+x)^{34}$ are equal ,find r

Long answer type question-I : (4 marks each)

9. Find the coefficient of a^4 in the product $(1+2a)^4(2-a)^5$ using binomial theorem.
10. If in the expansion of $(1+x)^n$,the coefficients of 14^{th},15^{th} and 16^{th} terms are in A.P, find n.

Long answer type question-II : (6 marks each)

11. If the coefficients of a^{r-1}, a^r *and* a^{r+1} in the expansion of $(1+a)^n$ are in arithmetic progression, prove that $n^2-n(4r+1)+4r^2-2=0$.
12. If three consecutive coefficients in the expansion of $(1+x)^n$ are in the ratio 6:33:110,

    find n and r.

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SUBJECT-MATHEMATICS, CLASS-XI
CHAPTER-8 (BINOMIAL THEOREM)
WORSHEET(ADVANCE)

Choose the correct option: (1 mark each)

1. The coefficient of x^p and x^q (p and q are positive integers) in the expansion of $(1+x)^{p+q}$ are
   (a) Equal (b) equal with opposite signs (c)reciprocal of each other (d)none of these
2. The ratio of the coefficient of x^{15} to the term independent of x in $\left(x^2+\frac{2}{x}\right)^{15}$ is
   (a) 12:32 (b)1:32 (c) 32:12 (d) 32:1

Fill in the blanks: (1 mark each)

3. The number of terms in the expansion of $(x+y+z)^n$ is ……..
4. In the expansion of $\left(x^2-\frac{1}{x^2}\right)^{16}$, the value of constant term is …….

Answer the following: (1 mark each)

5. Determine whether the expansion of $\left(x^2-\frac{2}{x}\right)^{18}$ will contain a term containing x^{10} ?
6. Find the middle term in the expansion of $\left(2ax-\frac{b}{x^2}\right)^{12}$

Short Answer Type Question (2 marks each)

7. If n is a positive integer, find the coefficient of x^{-1} in the expansion of $(1+x)^n\left(1+\frac{1}{x}\right)^n$
8. If p is a real number and if the middle term in the expansion of $\left(\frac{p}{2}+2\right)^8$ is 1120 , find p.

Long answer type question-I : (4 marks each)

9. Find n ,if the ratio of the fifth term from the beginning to the fifth term from end in the expansion of $\left(\sqrt[4]{2}+\frac{1}{\sqrt[4]{3}}\right)^n$ is $\sqrt{6}:1$
10. Using binomial theorem , show that $3^{4n+1}+16n-3$ is divisible by 256 if n is a positive integer.
11. If the coefficient of second ,third and fourth terms in the expansion of $(1+x)^{2n}$ are in A.P. Show that $2n^2-9n+7=0$
12. In the expansion of $(x+a)^n$ if the sum of odd terms is denoted by O and the sum of even term by E. Then prove that
    (i)$O^2-E^2=(x^2-a^2)^n$
    (ii)$4OE=(x+a)^{2n}-(x-a)^{2n}$

Long answer type question-II : (6 marks each)

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

14. If a_1, a_2, a_3 and a_4 be any four consecutive coefficients in the expansion of $(1 + x)^n$, Prove that $\frac{a_1}{a_1 + a_2} + \frac{a_3}{a_3 + a_4} = \frac{2a_2}{a_2 + a_3}$