

PAST EXAMINATION QUESTIONS : BINOMIAL THEOREM

PART 9

1. (a) Find the coefficient of x in the expansion of $(x^2 - \frac{3}{x})^5$.
 (b) Obtain the first 4 terms in the expansion of $(1 + p)^7$ in ascending powers of p . Hence find the coefficient of x^3 in the expansion of $(1 + x + 2x^2)^7$. (N98/P1/5)
2. Find, in terms of a , the coefficient of x^2 in the expansion of $(1 - 3x)(1 + ax)^6$. Given that the coefficient of x^2 is 24 and that a is positive, evaluate (i) a , (ii) the coefficient of x in the expansion. (J99/P1/4)
3. Find the term independent of x in the expansion of $(2x - \frac{1}{2x^2})^9$. (N99/P1/4)
4. (a) In the expansion of $(1 - ax)^{13}$, where a is a positive constant, the coefficient of x^2 is 702.
 (i) Find the value of a .
 (ii) Evaluate the coefficient of x^3 .
 (b) Find the term independent of x in the expansion of $(x + \frac{1}{2x})^8$. (J2000/P1/4)
5. Find the coefficient of x^3 in the expansion of $(10 - 7x)(1 + \frac{x}{5})^8$. (N2000/P1/4)
6. Find the coefficient of x^3 in the expansion of (i) $(2 - 3x)^6$, (ii) $(1 + 2x)(2 - 3x)^6$. (sp1/3)
7. The coefficient of x^2 in the expansion of $(2 + x)(1 - ax)^5$ is zero. Find the positive value of a . (J01/P1/8)
8. In the expansion of $(1 - 2x)^n$ the sum of the coefficients of x and x^2 is 16. Given that n is positive, find the value of (i) n , (ii) the coefficient of x^3 . (N01/P1/5)
9. Obtain
 (i) the expansion, in ascending powers of x , of $(2 - x^2)^5$,
 (ii) the coefficient of x^6 in the expansion of $(1 + x^2)^2(2 - x^2)^5$. (J2002/P1/7)
10. Find the first three terms in the expansion, in ascending powers of x , of $(2 + x)^6$ and hence obtain the coefficient of x^2 in the expansion of $(2 + x - x^2)^6$. (N2002/P2/2)

1. (a) -270
 (b) First 4 terms = $1 + 7p + 21p^2 + 35p^3$
 Coefficient of $x^3 = 119$
2. $(1 - 3x)(1 + 6ax + 15a^2x^2 + \dots)$
 (i) $a = 2$
 (ii) coefficient of $x = 9$
3. -672
4. (a) (i) $a = 3$ (ii) -7722
 (b) $4\frac{3}{8}$
5. $-3\frac{9}{25}$
6. (i) -4320 (ii) 0
7. $a = \frac{1}{4}$
8. (i) $n = 4$ (ii) -32
9. (i) $32 - 80x^2 + 80x^4 - 40x^6 + 10x^8 - x^{10}$
 (ii) 40
10. $64 + 192x + 240x^2 + \dots; 48$