

Binomial Theorem — CBSE Pattern Test 1

Class 11 Maths · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 1 — CBSE Pattern (90 minutes, 40 marks)

Class 11 Maths · Binomial Theorem · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.
 (2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.
 (3) For MCQ questions choose the single correct option; for VSA answers write a single line.
 (4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

1. The binomial expansion of $(a + b)^n$ has
 - (A) $n + 1$ terms
 - (B) n terms
 - (C) $2n$ terms
 - (D) n^2 terms
2. In the expansion of $(x + 2)^5$, the number of terms is
 - (A) 6
 - (B) 5
 - (C) 10
 - (D) 25
3. The third row of Pascal's triangle ($n = 2$) is
 - (A) 1, 2, 1
 - (B) 1, 1
 - (C) 1, 3, 3, 1
 - (D) 1, 4, 6, 4, 1
4. The general term ($r + 1$)-th term in the expansion of $(a + b)^n$ is
 - (A) $nCr a^{(n-r)} b^r$
 - (B) $nCr a^r b^{(n-r)}$
 - (C) $nPr a^{(n-r)} b^r$
 - (D) $a^n b^r$
5. If n is even, the expansion of $(a + b)^n$ has
 - (A) one middle term
 - (B) two middle terms
 - (C) no middle term
 - (D) n middle terms
6. The sum of all binomial coefficients $C(n,0) + C(n,1) + \dots + C(n,n)$ is
 - (A) 2^n
 - (B) n^2
 - (C) $2n$
 - (D) $n!$
7. The value of $(1.01)^5$ can be approximated using
 - (A) the binomial expansion

- (B) logarithms only
 (C) Pascal's triangle only
 (D) factorials
8. The first term of the expansion of $(a + b)^n$ is
 (A) a^n
 (B) b^n
 (C) na
 (D) ab
9. Write the binomial expansion of $(a + b)^n$.
10. Write the general term of the expansion of $(a + b)^n$.

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. How many terms are there in the expansion of $(1 + x)^6$?
 12. What are the binomial coefficients for $n = 4$?
 13. Find the coefficient of x^5 in $(1 + x)^{10}$.
 14. How many middle terms are there when n is odd?

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Expand $(1 + x)^4$ using the binomial theorem.
 16. Find the coefficient of x^3 in the expansion of $(1 + x)^8$.
 17. Find the middle term in the expansion of $(x + 1/x)^6$.
 18. Prove that $C(n,0) + C(n,1) + \dots + C(n,n) = 2^n$.

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. Find the term independent of x in the expansion of $(x - 2/x^2)^9$.
 20. Using the binomial theorem, evaluate $(1.01)^5$ to three decimal places. Prove that $(\sqrt{2} + 1)^5 - (\sqrt{2} - 1)^5 = 82\sqrt{2}$.

Answer Key (Marking Scheme)

- Q1 — (A) $n + 1$ terms. Q2 — (A) 6. Q3 — (A) 1, 2, 1. Q4 — (A) $nCr a^{n-r} b^r$.
 Q5 — (A) one middle term. Q6 — (A) 2^n . Q7 — (A) the binomial expansion. Q8 — (A) a^n .
 Q9 — $nC0 a^n + nC1 a^{n-1} b + \dots + nCn b^n$.
 Q10 — $T(r+1) = nCr a^{n-r} b^r$.
 Q11 — 7.
 Q12 — 1, 4, 6, 4, 1.
 Q13 — $10C5 = 252$.
 Q14 — Two.
 Q15 — $1 + 4x + 6x^2 + 4x^3 + x^4$.
 Q16 — 56.
 Q17 — 20.
 Q18 — Put $x = 1$ in $(1 + x)^n$.
 Q19 — $r = 3$; term = -672 .

Q20 — $1.051; 82\sqrt{2}$.