

Binomial Theorem — CBSE Pattern Test 2

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

Test 2 — 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. Each number in Pascal's triangle is the sum of
 - (A) the two numbers above it
 - (B) the number to its left only
 - (C) the number to its right only
 - (D) all numbers in the row
2. The binomial coefficients for $n = 3$ are
 - (A) 1, 3, 3, 1
 - (B) 1, 2, 1
 - (C) 1, 4, 6, 4, 1
 - (D) 1, 3, 1
3. The coefficient of x^5 in $(1 + x)^{10}$ is
 - (A) ${}^{10}C_5$
 - (B) ${}^{10}C_4$
 - (C) $5!$
 - (D) ${}^{10}P_5$
4. If n is odd, the expansion of $(a + b)^n$ has
 - (A) two middle terms
 - (B) one middle term
 - (C) no middle term
 - (D) n middle terms
5. The middle term in the expansion of $(a + b)^6$ is the
 - (A) 4th term
 - (B) 3rd term
 - (C) 5th term
 - (D) 6th term
6. The coefficients equidistant from the ends in $(a + b)^n$ are
 - (A) equal
 - (B) always different
 - (C) increasing
 - (D) zero
7. The binomial theorem can be applied to find
 - (A) the approximate value of numbers close to 1

- (B) only exact integers
 (C) square roots only
 (D) trigonometric ratios
8. The value of $C(n,0) + C(n,1) + \dots + C(n,n)$ for $n = 4$ is
 (A) 16
 (B) 8
 (C) 10
 (D) 4
9. Write the first four rows of Pascal's triangle.
10. How many middle terms are there when n is even?

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

11. How many terms are there in the expansion of $(1 + x)^6$?
12. Write the expansion of $(a + b)^4$ using Pascal's triangle.
13. Evaluate $C(4,0) + C(4,1) + \dots + C(4,4)$.
14. Which term is the middle term in the expansion of $(a + b)^6$?

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

15. Expand $(2x + 1)^3$ using the binomial theorem.
16. Find the 5th term in the expansion of $(x + 2)^6$.
17. Find the two middle terms in the expansion of $(a + b)^7$.
18. Find the value of $(2 + \sqrt{3})^4 - (2 - \sqrt{3})^4$.

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

19. Prove that $C(n,0) + C(n,1) + C(n,2) + \dots + C(n,n) = 2^n$ and $C(n,1) + C(n,3) + \dots = 2^{n-1}$.
20. Find the middle term in the expansion of $(2x + 1/x^2)^8$. Using the binomial theorem, find the value of $(1.02)^6$ correct to three decimal places.

Answer Key (Marking Scheme)

- Q1 — (A) the two numbers above it. Q2 — (A) 1, 3, 3, 1. Q3 — (A) 10C5. Q4 — (A) two middle terms.
 Q5 — (A) 4th term. Q6 — (A) equal. Q7 — (A) the approximate value of numbers close to 1. Q8 — (A) 16.
 Q9 — 1; 1 1; 1 2 1; 1 3 3 1.
 Q10 — One.
 Q11 — 7.
 Q12 — $a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$.
 Q13 — 16.
 Q14 — The 4th term.
 Q15 — $8x^3 + 12x^2 + 6x + 1$.
 Q16 — $240x^2$.
 Q17 — The 4th and 5th terms.
 Q18 — $96\sqrt{3}$.

Q19 — Proofs as in notes.

Q20 — 5th term; 1.126.