EngineeringRise

Binomial theorem for a positive integral index and the general term

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
Expansion	(a + b)^n = sum over r = 0 to n of C(n,r) a^(n-r) b^r Valid when: n is a non-negative integer; a, b any numbers or expressions	dimensionless
General term	T(r+1) = C(n,r) a^(n-r) b^r Valid when: n is a non-negative integer; r = 0, 1, ..., n	dimensionless
Number of terms	n + 1; for (a+b)^n + (a-b)^n it is floor(n/2) + 1 Valid when: n is a non-negative integer; a, b independent non-zero	dimensionless
Symmetry	C(n,r) = C(n,n-r) Valid when: n is a non-negative integer, 0 <= r <= n	dimensionless
Ratio of coefficients	C(n,r+1)/C(n,r) = (n-r)/(r+1) Valid when: n a positive integer, 0 <= r < n	dimensionless
pth term from the end	T(n - p + 2) counted from the beginning Valid when: n is a positive integer, 1 <= p <= n + 1	dimensionless
Sum of coefficients	put a = b = 1 (or x = 1): 2^n for (1 + x)^n Valid when: n positive integer; sum of coefficients of the expansion in x	dimensionless
Sign in (a - b)^n	T(r+1) carries (-1)^r Valid when: expansion of (a - b)^n, n a positive integer	dimensionless

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/mathematics/binomial-theorem/binomial-theorem-for-a-positive-integral-index-ar

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