EngineeringRise

Combinations and selections

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

Result	Formula	Units or note
Combinations	C(n, r) = n!/(r!(n - r)!) Valid when: choose r of n distinct objects, order ignored, 0 <= r <= n	dimensionless
Link with permutations	P(n, r) = C(n, r) x r! Valid when: n distinct objects, 0 <= r <= n	dimensionless
Symmetry	C(n, r) = C(n, n - r) Valid when: integers 0 <= r <= n	dimensionless
Boundary values	C(n, 0) = C(n, n) = 1, C(n, 1) = n Valid when: n a non-negative integer	dimensionless
Pascal rule	C(n, r) + C(n, r - 1) = C(n + 1, r) Valid when: integers n and r with 1 <= r <= n	dimensionless
Equal values	C(n, x) = C(n, y) implies x = y or x + y = n Valid when: integers x, y between 0 and n	dimensionless
Non-empty selections	one or more of n different objects: 2^n - 1 Valid when: n different objects, any number chosen, at least one	dimensionless
Triangles with k collinear	C(n, 3) - C(k, 3) Valid when: n points, k collinear, no other three collinear	dimensionless
Lines with k collinear	C(n, 2) - C(k, 2) + 1 Valid when: n points, exactly k collinear, no other three collinear	dimensionless
Diagonals of n-gon	C(n, 2) - n Valid when: convex polygon with n >= 3 sides	dimensionless

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/mathematics/permutations-and-combinations/combinations-and-selections

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