EngineeringRise

Geometric progressions

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

Result	Formula	Units or note
Common ratio	r = T_(n+1)/T_n Valid when: GP with nonzero terms	dimensionless
nth term	T_n = a r^(n-1) Valid when: GP with first term a, n a positive integer	dimensionless
Term ratio	T_p / T_q = r^(p - q) Valid when: GP with nonzero terms, p and q positive integers	dimensionless
Sum of n terms	S_n = a(r^n - 1)/(r - 1), r not 1 Valid when: GP with r not equal to 1	dimensionless
Sum when r = 1	S_n = n a Valid when: GP with r = 1 (all terms equal)	dimensionless
Sum to infinity	S = a/(1 - r), |r| < 1 Valid when: infinite GP with |r| < 1 (the series converges)	dimensionless
Middle-term rule	a, b, c in GP: b^2 = a c Valid when: a, b, c are consecutive terms of a GP	dimensionless
Three terms in GP	m/r, m, m r (product m^3) Valid when: three consecutive GP terms, r not 0	dimensionless
Splitting a sum	S_(2n) = S_n (1 + r^n) Valid when: GP with r any value, n terms each half	dimensionless
Squares of terms	GP with first term a^2 and ratio r^2 Valid when: squares of the terms of a GP with first term a and ratio r	dimensionless

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/mathematics/sequences-and-series/geometric-progressions

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