EngineeringRise

Arithmetic and geometric means and the AM-GM relation

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

Result	Formula	Units or note
Common difference for n AMs	d = (b - a)/(n + 1) Valid when: a and b are the end terms; n AMs inserted between them (n+2 terms in AP)	dimensionless
Sum of n AMs	n(a + b)/2 Valid when: n AMs inserted between a and b in AP	dimensionless
Common ratio for n GMs	r^(n+1) = b/a Valid when: n GMs inserted between a and b; a, b same sign	dimensionless
Product of n GMs (positive ratio; negative ratio gives factor (-1)^(n(n+1)/2))	(ab)^(n/2) Valid when: n GMs inserted with positive common ratio	dimensionless
AM and GM of two numbers	A = (a + b)/2, G = square root of (ab) Valid when: a, b positive (GM needs ab > 0)	dimensionless
AM-GM	A >= G, equality only for a = b Valid when: a, b positive real numbers	dimensionless
Difference	A - G = (square root of a - square root of b)^2 / 2 Valid when: a, b positive real numbers	dimensionless
Link	G^2 = a b, and a + b = 2A Valid when: a, b positive real numbers	dimensionless
n numbers	(x_1 + ... + x_n)/n >= (x_1 ... x_n)^(1/n) Valid when: x_1 ... x_n all positive reals; equality when all are equal	dimensionless
Numbers from A and G	roots of x^2 - 2A x + G^2 = 0 Valid when: a, b positive; A >= G so roots are real	dimensionless

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

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