Arithmetic and Geometric Progressions

nth term and sum of n terms of an arithmetic progression and of a geometric progression, and the sum to infinity of a geometric progression when it converges.

Method: Arithmetic and geometric series (standard algebra)

Input parameters

Unit system: SI

Parameter	Value	Unit
First term	2.0000	
Common difference (AP)	3.0000	
Common ratio (GP)	0.50000	
Number of terms	10.000	

Calculated results

Parameter	Value	Unit
AP nth term	29.000	
AP sum of n terms	155.00	
GP nth term	0.003906	
GP sum of n terms	3.9961	
GP sum to infinity (NaN if it diverges)	4.0000	

Notes for this case

- Geometric series appear in compound interest, decay of oscillations and multiple-effect calculations.

Formula and method

$$a_n = a + (n-1)d, \quad S_n = \frac{n}{2}[2a + (n-1)d], \quad S_n = a\frac{1-r^n}{1-r}, \quad S_\infty = \frac{a}{1-r}$$

Variables

a	First term	-
d	Common difference (AP)	-
r	Common ratio (GP)	-
n	Number of terms	-
a_n	AP nth term	-
S_n^{AP}	AP sum of n terms	-
g_n	GP nth term	-
S_n^{GP}	GP sum of n terms	-
S_∞	GP sum to infinity (NaN if it diverges)	-

Method and standards

Series formulae.

Assumptions and limits

- Real terms. Geometric terms too large to represent (for example r = 10 with n = 1000) are not shown.

References

• Arithmetic and geometric series (standard algebra)

Report details

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Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/general/geometry/arithmetic-geometric-progression

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Reopens the calculator with the inputs of this report.