

1. Arithmetic and Geometric Progressions

Preliminaries

Let a_n , d and S_n be, respectively, the n th term, the common difference and the sum of the first n terms of an *arithmetic progression*. Then

$$a_n = a_1 + d(n-1) \quad (1)$$

and

$$S_n = \frac{(a_1 + a_n) \cdot n}{2} = \frac{[a_1 + d(n-1)] \cdot n}{2}. \quad (2)$$

If u_n , q and S_n are the n th term, the common ratio and the sum of the first n terms of a *geometric progression*, then

$$u_n = u_1 q^{n-1} \quad (3)$$

and

$$S_n = \frac{u_n q - u_1}{q-1} = \frac{u_1 (q^n - 1)}{q-1}. \quad (4)$$

Finally, if S is the sum of an infinite geometric series with $|q| < 1$ then

$$S = \frac{u_1}{1-q}. \quad (5)$$