

# Math Formulas: Arithmetic and Geometric Series

## Notation:

Number of terms in the series:  $n$

First term:  $a_1$

$N^{\text{th}}$  term:  $a_n$

Sum of the first  $n$  terms:  $S_n$

Difference between successive terms:  $d$

Common ratio:  $q$

Sum to infinity:  $S$

## Arithmetic Series Formulas:

1. 
$$a_n = a_1 + (n - 1)d$$

2. 
$$a_i = \frac{a_{i-1} + a_{i+1}}{2}$$

3. 
$$S_n = \frac{a_1 + a_n}{2} \cdot n$$

4. 
$$S_n = \frac{2 \cdot a_1 + (n - 1) \cdot d}{2} \cdot n$$

## Geometric Series Formulas:

5. 
$$a_n = a_1 \cdot q^{n-1}$$

6. 
$$a_i = \sqrt{a_{i-1} \cdot a_{i+1}}$$

7. 
$$S_n = \frac{a_n q - a_1}{q - 1}$$

8. 
$$S_n = \frac{a_1 \cdot (q^n - 1)}{q - 1}$$

9. 
$$S = \frac{a_1}{1 - q}, \quad (\text{for } -1 < q < 1)$$