

SEQUENCES & SERIES

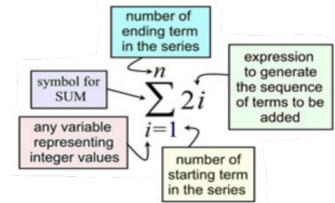
Things to Remember

- A **sequence** is an ordered list of numbers where each term is obtained by a fixed rule.
- n represents the *number* of the term in that sequence.
- a_n represents the numerical *value* of that term
- Explicit formula can be used to find *any* term in the sequence
- Recursive formula is used to find *the next* term in the sequence

- A **series** is a sum of all the terms in a sequence.
 - Denoted by S_n
 - Key words: total, altogether, sum, series, ...
 - Can also be represented using the summation symbol: $\Sigma \rightarrow$

Sequence: 3, 5, 7, 9...

In this sequence above, 5 is the 2nd term. This means that $n = 2$ and $a_2 = 5$, so the term *number* is 2 and the *value* of that term is 5. Since 9 is the 4th term, $n = 4$ and $a_4 = 9$, etc.



Arithmetic	Geometric
<p>Arithmetic: Adding</p> <ul style="list-style-type: none"> ● If subtracting \rightarrow add a negative ● d - Common Difference ● Common Difference (d): $a_2 - a_1$ 	<p>Geometric: Multiplying</p> <ul style="list-style-type: none"> ● If dividing \rightarrow multiply by reciprocal ● r - Common Ratio ● Common Ration (r): $\frac{a_2}{a_1}$
Explicit Sequence Formulas	<div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> $a_n = a_1 + (n - 1)(d)$ <p style="text-align: center; font-size: small;">where "a_1" is the first term of the sequence, "n" is the desired term, and "d" is the common difference.</p> <p style="text-align: center; font-size: x-small;">*On reference sheet</p> </div> <div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> $a_n = a_1 \cdot (r)^{n-1}$ <p style="text-align: center; font-size: small;">where "a_1" is the first term of the sequence, "n" is the desired term, and "r" is the common ratio.</p> <p style="text-align: center; font-size: x-small;">*On reference sheet</p> </div>
Recursive Sequence Formulas	<div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> $a_1 = ?$ $a_n = a_{n-1} + d$ <p style="text-align: center; font-size: small;">where "a_1" is the first term of the sequence, "n" is the desired term, and "d" is the common difference.</p> </div> <div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> $a_1 = ?$ $a_n = a_{n-1} \cdot r$ <p style="text-align: center; font-size: small;">where "a_1" is the first term of the sequence, "n" is the desired term, and "r" is the common ratio.</p> </div>
Series Formulas	<div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> $S_n = \frac{n(a_1 + a_n)}{2}$ <p style="text-align: center; font-size: small;">where n is the number of terms in the sum, a_1 is the first term, and a_n is the nth term in the sum</p> </div> <div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> $S_n = \frac{a_1(1 - r^n)}{1 - r}$ <p style="text-align: center; font-size: small;">where r is the common ratio and $r \neq 1$, n is the number of terms in the sum, a_1 is the first term.</p> <p style="text-align: center; font-size: x-small;">*On reference sheet</p> </div>