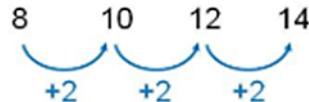


Key Vocabulary

Sequence	A set of numbers which all obey a rule.
Term	A single number or variable
Difference	The difference between two quantities or values, found by subtraction
Descending	Largest to smallest
Ascending	Smallest to Biggest
Linear	The highest power is 1 in the expression, x or y etc
Quadratic	The highest power is 2 in the expression, there is a squared, eg x^2 , y^2 etc
Term-to-term rule E.g. +2 or x3	The rule that takes you from one term in a sequence to the next
Position-to-term rule E.g. $5n + 3$	The rule that lets you find the 1 st , 2 nd , or any position term in a sequence
nth term E.g. $5n + 2$	The same as the position-to-term rule, allowing you to find any term in the sequence
Fibonacci sequence	Starts with 1, 1 and the next term in the sequence is found by adding the two previous terms

Key facts / Diagrams

Example
Find the nth term rule.
8, 10, 12, 14



Therefore: $2n$ (2 being the difference between terms (n))

Term (n)	1	2	3	4
$2n$	2	4	6	8

What do I need to add to $(2n)$ to get to the original sequence?

	+6	+6	+6	+6
Original sequence	8	10	12	14

Nth term = $2n + 6$

For Quadratic Sequences

If the 2 nd difference is 2	The sequence starts n^2
If the 2 nd difference is 4	The sequence starts $2n^2$
If the 2 nd difference is 6	The sequence starts $3n^2$

To find the number of n^2 's needed in the *nth* term rule, halve the second difference.

Common misconceptions

- Some pupils will think that the nth term of the sequence 2, 5, 8, 11, ... is $n + 3$.
- Some pupils may think that the $(2n)$ th term is double the nth term of a linear sequence.
- Some pupils may think that sequences with nth term of the form ' $ax \pm b$ ' must start with 'a'.

Worked examples

1. Find the first 3 terms of

a) **$6n + 1$**

$n = 1,$ $n = 2,$ $n = 3$
 $6 \times 1 + 1 = 7$ $6 \times 2 + 1 = 13$ $6 \times 3 + 1 = 19$ **7, 13, 19**

b) **$n^2 + 2n + 5$**

$n = 1$ $n = 2$ $n = 3$
 $1^2 + 2 \times 1 + 5 = 8$ $2^2 + 2 \times 2 + 5 = 13$ $3^2 + 2 \times 3 + 5 = 20$ **8, 13, 20**

QUADRATIC SEQUENCES

4	7	12	19	28
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Find the first difference:

4	7	12	19	28
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Find the second difference:



Second difference is 2, so ... = **n^2**