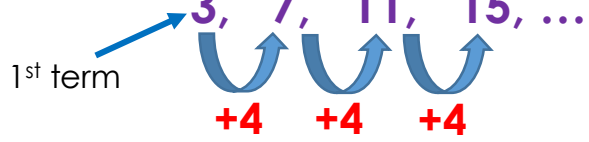
Y8 Mastery: Unit 1 – Sequences

A set of numbers in a specific order is called a **sequence**.

Each number in the sequence is called a **term**.

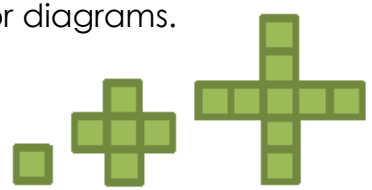
This is an **arithmetic sequence** because there is a **common difference** between terms.



Common difference = **+4**

Picture Sequences

Sometimes sequences are given as pictures or diagrams.

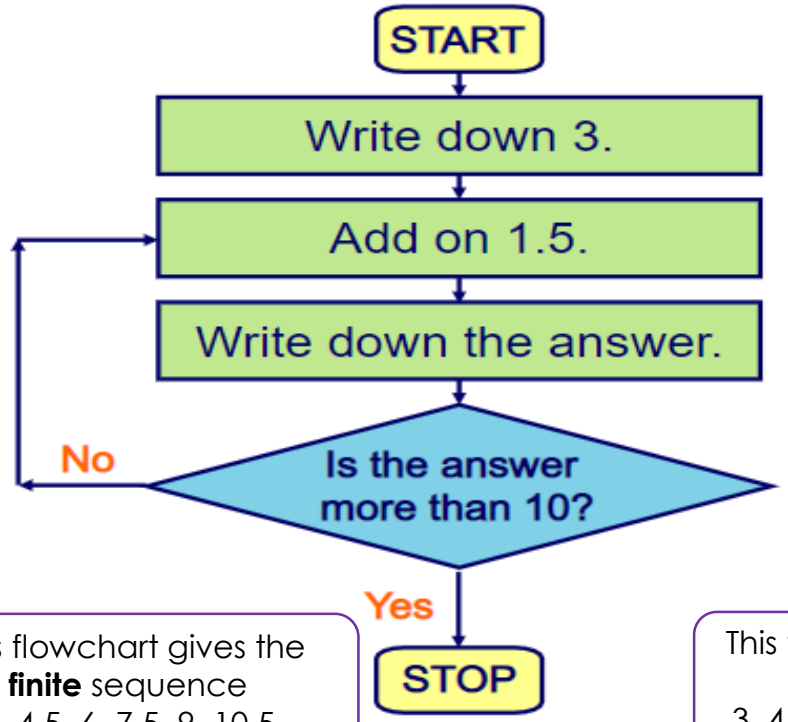


First term 1
Add 4 each time
1, 5, 9, …

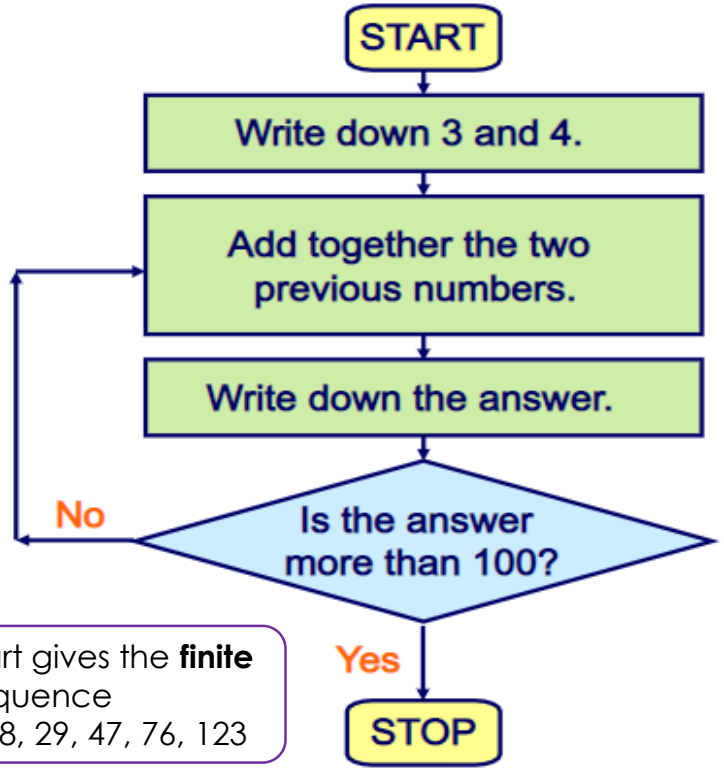
First term 1
Add 2 each time
1, 3, 5, …

Using Flowcharts

Sequences can be generated using a flow chart.



This flowchart gives the **finite** sequence
3, 4.5, 6, 7.5, 9, 10.5



This flowchart gives the **finite** sequence
3, 4, 7, 11, 18, 29, 47, 76, 123

Keyword/Skill	**Definition/Tips**
Variable	A symbol for a number we do not know yet, it is usually a letter.
Term	Either a single number or a **variable,** such as 4 or n.
nth term	A rule or formula to work out any term in a sequence.
Expression	A mathematical statement written using **symbols**, **numbers** or **letters**.
Equation	A statement showing that **two expressions are equal.**
Formula	Shows the **relationship** between **two or more variables.**
Substitute	In algebra it means replacing letters with numbers.
Finite	Has a set end point.
Infinite	Continues forever, and ever, and ever, and ever…
Constant Difference	The amount increases or decreases by the same amount each time
Sequence	A list of numbers or objects arranged in a specific order.

Other Topics/Units this could appear in:

Crossover Unit 49 Sequences

Y8 Mastery: Unit 1 – Sequences

Continuing Sequences

Examples:
Find the next two terms in the following sequences:

a) 1, 3, 5, 7, 9, … 11, 13 (adding 2 each time)

b) 2, 4, 8, 16, 32, … 64, 132 (doubling each time)

c) 50, 45, 40, 35, … 30, 25 (subtracting 5 each time)

d) 1, 1, 2, 3, 5, 8, … 13, 21 (adding the two previous terms together)

This is called a Fibonacci sequence.

We can **calculate** a given **term** in a **sequence** by **substituting** (replacing) the letter **n** in the **nth term formula** with the given number.

Find the 10th, 100th… term

Examples: Find the 10th, 50th and 35th terms:
a) 2n b) 2n – 10

a) 2n means 2 x n
so 10th term = 2 x 10 = 20
50th term = 2 x 50 = 100
35th term = 2 x 35 = 70

b) 2n – 10 means 2 x n – 10
so 10th term = 2 x 10 – 10 = 10
50th term = 2 x 50 – 10 = 90
35th term = 2 x 35 – 10 = 60

The nth term

Step 1: Find the **common difference**

3, 7, 11, 15, …

+4 +4 +4

Common difference = **+4**

Step 2: Write down that **times table**

4, 8, 12, 16, …

Write the 4x table **4n**

3, 7, 11, 15, …

Step 3: Find what you need to **add/subtract**

4, 8, 12, 16, …

-1 -1 -1 -1

3, 7, 11, 15, …

Subtract 1 from the 4x table **4n - 1**

The nth term is **4n - 1**

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Crossover Unit 49