

SEQUENCES

Key Concepts

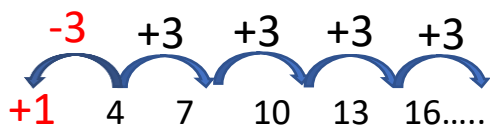
Arithmetic or linear sequences
increase or decrease by a common amount each time.

Geometric series has a common multiple between each term.

Quadratic sequences include an n^2 . It has a common second difference.

Fibonacci sequences are where you add the two previous terms to find the next term.

Linear/arithmetic sequence:



a) State the nth term

$$3n + 1$$

Difference The 0th term

b) What is the 100th term in the sequence?

$$3n + 1$$

$$3 \times 100 + 1 = 301$$

c) Is 100 in this sequence?

$$3n + 1 = 100$$

$$3n = 99$$

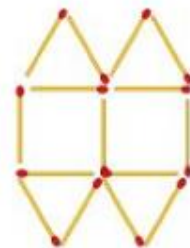
$$n = 33$$

Yes as 33 is an integer.

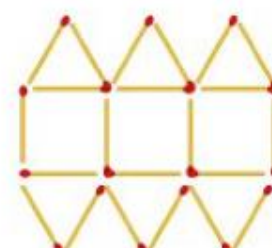
Pattern 1



Pattern 2



Pattern 3



Examples

Linear sequences with a picture:

State the nth term.

Hint: Firstly write down the number of matchsticks in each image:

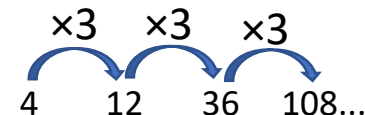
Pattern 1	Pattern 2	Pattern 3
8	15	22

+1

-7 +7 +7

$$7n + 1$$

Geometric sequence e.g.



Quadratic sequence e.g.

$n^2 + 4$ Find the first 3 numbers in the sequence

First term: $1^2 + 4 = 5$

Third term: $3^2 + 4 = 13$

Second term: $2^2 + 4 = 8$

Key Words

Linear
Arithmetic
Geometric
Sequence
Nth term

1) 1, 8, 15, 22, ...

a) Find the nth term b) Calculate the 50th term c) Is 120 in the sequence?

2) $n^2 - 5$ Find the first 4 terms in this sequence

Year 10 SEQUENCES

Key Concepts

Arithmetic sequences
increase or decrease by a common amount each time.

Quadratic sequences have a common 2nd difference.

Fibonacci sequences
Add the two previous terms to get the next term

Geometric series has a common multiple between each term

 hegartymaths
**198, 247-250,
264**

Linear sequences:

4, 7, 10, 13, 16.....

a) State the nth term

$3n + 1$
Difference ← ← The 0th term

Examples

b) What is the 100th term in the sequence?

$$3n + 1$$

$$3 \times 100 + 1 = 301$$

c) Is 100 in this sequence?

$$3n + 1 = 100$$

$$3n = 99$$

$$n = 33$$

Yes as 33 is an integer.

Quadratic sequences:

$a + b + c$	3	9	19	33	51
$3a + b$	6	10	14	18	
$2a$	4	4	4		

First difference

Second difference

$$2a = 4 \quad 3a + b = 6 \quad a + b + c = 3$$

$$a = 2 \quad 3 \times 2 + b = 6 \quad 2 + 0 + c = 3$$

$$b = 0 \quad c = 1$$

$$2n^2 + 0n + 1 \rightarrow 2n^2 + 1$$

Key Words

Linear
Quadratic
Arithmetic
Geometric
Sequence
Nth term

A) 1, 8, 15, 22,

1) Find the nth term b) Calculate the 50th term c) Is 120 in the sequence?

B) Find the nth term for:

1) 5, 12, 23, 38, 57, ... 2) 3, 11, 25, 45, 71,