GCSE Mathematics

Sequences

Questions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation

Worked Examples

[Fluency]

Find the nth term of: 3, 7, 11, 15, ...

Differences are 4 (constant) → arithmetic with d=4

$$a_1 = 3,\ d = 4 \Rightarrow \text{nth term} = 4n - 1$$

[Reasoning]

Is 100 a term in the sequence 4n – 1?

$$4n - 1 = 100 \Rightarrow n = \frac{101}{4} = 25.25 \quad \text{Not an integer} \Rightarrow \textbf{No}$$

[Problem Solving]

Write down the first 5 terms of the sequence with nth term 3n + 2.

n=1:5, n=2:8, n=3:11, n=4:14, n=5:17 → **5, 8, 11, 14, 17**

[Fluency]

1. Write down the next three terms of: 5, 8, 11, 14, ...

(2 marks)

[Fluency]

2. Find the nth term of: 3, 7, 11, 15, ...

(2 marks)

[Fluency]

3. Find the 50th term of the sequence with nth term 4n – 1.

(1 mark)

[Fluency]

4. Is 75 a term in the sequence 5n + 2? Show how you decide.

(2 marks)

[Fluency]

5.

Find the nth term of: 10, 7, 4, 1, –2, ...

(3 marks)

[Reasoning]

6.

A sequence has nth term 2n + 5.

Which term of the sequence has value 31?

(2 marks)

[Reasoning]

7.

Two sequences are: A: 4n – 1 and B: 5n – 3.

Find the first value that appears in both sequences.

(4 marks)

[Reasoning]

8.

The nth term of a sequence is $n^2 + 1$.

(a) Find the first four terms. (2)

(b) Is 50 a term in this sequence? Show your working. (2)

(4 marks)

[Problem Solving]

9.

Here are the first four terms of a sequence: 4, 7, 12, 19, ...

(a) Find the next term. (1)

(b) Explain whether the sequence is arithmetic. (1)

(2 marks)

[Problem Solving]

10.

The first term of an arithmetic sequence is a and the common difference is d.

The 5th term is 17 and the 10th term is 32.

Find a and d.

(4 marks)

Section B — Higher

Worked Examples

[Fluency]

Find the nth term of the quadratic sequence: 3, 8, 15, 24, ...

Differences: 5, 7, 9, ... → 2nd differences = 2 → a = 1

$n^2 + 2n$: $n = 1 : 3$✓ $n = 2 : 8$✓ $n = 3 : 15$✓

[Reasoning]

Find the nth term of the geometric sequence: 2, 6, 18, 54, ...

$r = 3 \quad \text{nth term} = 2 \times 3^{n-1}$

[Problem Solving]

Find the sum of the geometric series: 2+6+18+54+162

$S_5 = \frac{2(3^5 - 1)}{3 - 1} = \frac{2 \times 242}{2} = 242$

[Fluency]

1.

Find the nth term of the quadratic sequence: 3, 8, 15, 24, 35, ...

(4 marks)

[Fluency]

2.

Find the nth term of the quadratic sequence: 2, 6, 12, 20, 30, ...

(4 marks)

[Fluency]

3.

Find the nth term of the geometric sequence: 2, 6, 18, 54, ...
Hence find the 7th term.

(3 marks)

[Reasoning]

4.

A geometric sequence has first term 5 and common ratio 2.
(a) Write down the first five terms. (2)
(b) Find the nth term. (1)
(c) Find the sum of the first 8 terms. (2)

(5 marks)

[Reasoning]

5.

Here is a quadratic sequence: 5, 14, 27, 44, 65, ...
Find the nth term.

(4 marks)

[Reasoning]

6.

The nth term of a quadratic sequence is $2n^2 - 3n + 1$.

(a) Find the first four terms. (2)

(b) Find the term in the sequence closest to 100. (3)

(5 marks)

[Problem Solving]

7.

A geometric sequence has 3rd term 12 and 6th term 96.
Find the first term and the common ratio.

(4 marks)

[Problem Solving]

8.

The 5th term of a quadratic sequence is 55 and the 6th term is 80.
The 2nd differences are constant at 6.
Find the nth term.

(5 marks)