Sequences: exam questions

10 questions · 26 marks · mark schemes at the end

Name _____ Date _____ Score / 26

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/sequences

1. **2 marks**

Here are the first four terms of an arithmetic sequence.

7 11 15 19

Find an expression, in terms of n, for the nth term.

2. **2 marks**

The nth term of a sequence is $4n + 3$.

Is 130 a term of the sequence? You must give a reason.

3. **2 marks**

Find an expression for the nth term of the sequence 20, 17, 14, 11, ...

4. **2 marks**

An arithmetic series has first term 5 and common difference 3.

Work out the sum of the first 20 terms.

5. **3 marks**

Here are the first five terms of a quadratic sequence.

3 9 19 33 51

Find an expression, in terms of n, for the nth term.

6. **4 marks**

The 4th term of an arithmetic series is 17 and the 9th term is 37.

Work out the sum of the first 15 terms of the series.

7. **3 marks**

Work out the sum of all the multiples of 3 from 3 to 198.

8. **2 marks**

The terms of a sequence are given by $u_{n+1} = 2u_n - 3$ and $u_1 = 5$.

Work out u_4.

9. **2 marks**

Find an expression for the nth term of the sequence $\frac{1}{3}, \frac{2}{5}, \frac{3}{7}, \frac{4}{9}, \ldots$

10. **4 marks**

An arithmetic series has first term 2 and common difference 5.

Find the least number of terms for the sum of the series to be greater than 1000.

Answers and worked solutions

Question 1 — 2 marks

M1 $4n + k$

A1 $4n + 3$

Answer: $4n + 3$

Question 2 — 2 marks

M1 $4n + 3 = 130$, so $n = 31.75$

A1 No, because n is not a whole number

Answer: No ($n = 31.75$ is not a whole number)

Question 3 — 2 marks

M1 $-3n + k$

A1 $23 - 3n$

Answer: $23 - 3n$

Question 4 — 2 marks

M1 $\frac{20}{2}(2 \times 5 + 19 \times 3)$

A1 670

Answer: 670

Question 5 — 3 marks

M1 second difference 4, so $2n^2$

M1 $3 - 2,\ 9 - 8,\ 19 - 18, \ldots$ gives 1 each time

A1 $2n^2 + 1$

Answer: $2n^2 + 1$

Question 6 — 4 marks

M1 $a + 3d = 17$ and $a + 8d = 37$

A1 $d = 4$ and $a = 5$

M1 $\frac{15}{2}(2 \times 5 + 14 \times 4)$

A1 495

Answer: 495

Question 7 — 3 marks

M1 66 terms

M1 $\frac{66}{2}(3 + 198)$

A1 6633

Answer: 6633

Question 8 — 2 marks

M1 $u_2 = 7$, $u_3 = 11$

A1 $u_4 = 19$

Answer: 19

Question 9 — 2 marks

M1 numerator n or denominator $2n + 1$

A1 $\frac{n}{2n + 1}$

Answer: $\frac{n}{2n + 1}$

Question 10 — 4 marks

M1 $S_n = \frac{n}{2}(4 + 5(n - 1)) = \frac{n(5n - 1)}{2}$

M1 $\frac{n(5n - 1)}{2} > 1000$, or trials

M1 $S_{20} = 990$ and $S_{21} = 1092$

A1 21

Answer: 21

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/sequences
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