Sequences questions and answers

10 questions · 6 Core, 4 Extended · 9 non-calculator · worked answers

Name _____ Date _____ Score _____

- Original questions in the style of the Cambridge 0580 papers, each labelled Core or Extended and calculator or non-calculator. Try every question before you look at the answers.
- Worked answers start after the questions. Questions with marks come from our 0580 practice bank (M method, A accuracy, B independent marks).
- Online, with more practice: igcsemathrevision.com/igcse-frontend/0580/sequences-questions

Core: for everyone (Papers 1 and 3, and Extended Papers 2 and 4)

1. **Core · non-calculator · easy**

Here are the first four terms of a sequence: $8,\ 14,\ 20,\ 26$

(a) Write down the next two terms.

(b) Write down the term-to-term rule.

2. **Core · non-calculator · easy**

Find the nth term of the sequence $5,\ 8,\ 11,\ 14,\ \ldots$

3. Core · non-calculator · easy · 2 marks

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

(a) Write down the first three terms.

(b) Find the 10th term.

4. Core · non-calculator · medium

The nth term of a sequence is $4n - 1$.
Is 99 a term of the sequence? Show how you decide.

5. Core · non-calculator · medium

Find the nth term of the sequence $3,\ 6,\ 11,\ 18,\ 27,\ \ldots$

6. Core · non-calculator · medium · 2 marks

Find an expression for the nth term of the sequence $0,\ 3,\ 8,\ 15,\ 24,\ \ldots$

Extended: for Papers 2 and 4

7. **Extended · non-calculator · medium**

Find the nth term of the sequence $5,\ 12,\ 23,\ 38,\ \ldots$

8. **Extended · non-calculator · hard**

Here are the first four terms of a sequence: $3,\ 6,\ 12,\ 24$

(a) Find an expression for the nth term.

(b) Work out the 8th term.

9. **Extended · non-calculator · hard**

The sequence $2,\ 9,\ 28,\ 65,\ \ldots$ has nth term T_n.

(a) Find an expression for T_n.

(b) Find T_{10}.

10. **Extended · calculator · hard · 3 marks**

The nth term of a sequence is $3n^2 - 2n$. Which term of the sequence is equal to 645?

Answers and worked solutions

Question 1

Answer: (a) $32, 38$ (b) add 6

1. The terms go up by 6 each time.
2. $26 + 6 = 32$, $32 + 6 = 38$

Question 2

Answer: $3n + 2$

1. The difference is 3, so the nth term starts $3n$.
2. $3 \times 1 = 3$ and the first term is 5, so add 2.

Question 3 — 2 marks

Answer: (a) $4, 7, 12$ (b) 103

B1 (a) 4, 7, 12

B1 (b) 103

Question 4

Answer: Yes, 99 is the 25th term

1. $4n - 1 = 99$ gives $4n = 100$, $n = 25$.
2. 25 is a whole number, so 99 is the 25th term.

Question 5

Answer: $n^2 + 2$

1. Compare with the square numbers $1, 4, 9, 16, 25$: each term is 2 more.

Question 6 — 2 marks

Answer: $n^2 - 1$

M1 compares with n^2: 1, 4, 9, 16, 25, or second difference 2

A1 $n^2 - 1$ oe

Question 7

Answer: $2n^2 + n + 2$

1. First differences: $7, 11, 15$. Second difference: 4, so the sequence starts $2n^2$.
2. Subtract $2n^2$ ($2, 8, 18, 32$): $3, 4, 5, 6$, which is $n + 2$.

Question 8

Answer: (a) $3 \times 2^{n-1}$ (b) 384

1. (a) Each term is double the one before, starting at 3: $3 \times 2^{n-1}$.
2. (b) $3 \times 2^7 = 3 \times 128 = 384$

Question 9

Answer: (a) $T_n = n^3 + 1$ (b) 1001

1. (a) Compare with the cube numbers $1, 8, 27, 64$: each term is 1 more, so $T_n = n^3 + 1$.
2. (b) $T_{10} = 1000 + 1 = 1001$

Question 10 — 3 marks

Answer: the 15th term

M1 $3n^2 - 2n = 645$

M1 solves $3n^2 - 2n - 645 = 0$, e.g. $(3n + 43)(n - 15) = 0$ or formula

A1 15th term

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