

2.5 Sequences

Name: _____ Class: _____ Date: _____

Total: 25 marks

KEY WORDS n th term

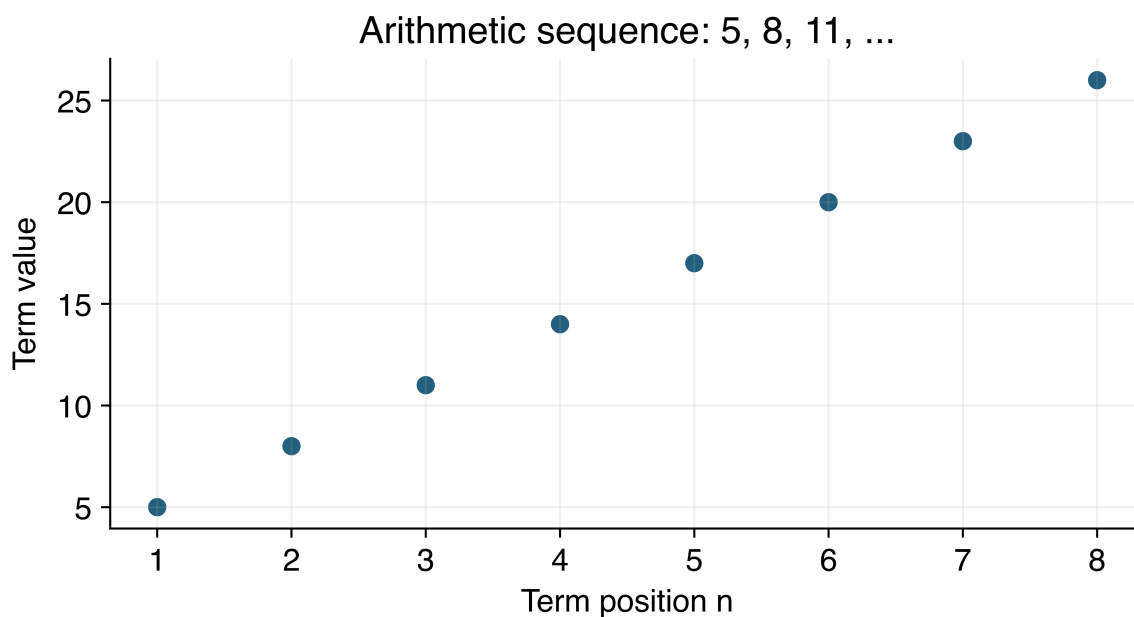
Sequences

Objective

Generate terms from term-to-term and position-to-term rules; recognise triangular, square, cube, Fibonacci, quadratic and geometric progressions incl. surd ratios; deduce linear and quadratic n th terms (rows A23–A25).

1 Key knowledge and worked examples

Types and n th terms. Triangular $\frac{1}{2}n(n+1)$, squares, cubes; Fibonacci adds the two previous terms. Linear n th term $an+b$; quadratic an^2+bn+c with $a = \frac{1}{2}$ (second difference): for 5, 9, 17, 29, 45, ... the differences are 4, 8, 12, 16 (second difference 4), so $a = 2$ and the sequence is $2n^2 - 2n + 5$ – check $n = 4$: $32 - 8 + 5 = 29$. Geometric: ratio constant.



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 Write the next two terms of 5, 9, 17, 29, 45, ... [2]

2.2 Find the n th term of 4, 7, 12, 19, 28, ... [3]

2.3 Find the n th term of 6, 11, 18, 27, 38, ... [3]

2.4 A Fibonacci-type sequence starts 2, 5, ...: write the next three terms. [2]

2.5 Which term of the sequence with n th term $3n + 2$ equals 62? [2]

3 Exam-style questions

3.1 (*Original.*) A sequence has n th term $n^2 + 2n$. (a) Write down the first four terms.
(b) Which term equals 168? [4]

3.2 (*Original.*) The first differences of a sequence are 5, 9, 13, 17, ... (a) Find the next difference. (b) The first term is 3: write the first four terms. (c) Find the n th term. [5]

3.3 (*Original.*) y is proportional to x^2 ; $y = 48$ when $x = 4$. (a) Find the equation. (b) Find y when $x = 7$. [4]
