2.6 Sequences

Name: _____ Class: _____ Date: _____ **Total: 22 marks**

KEY WORDS quadratic sequence

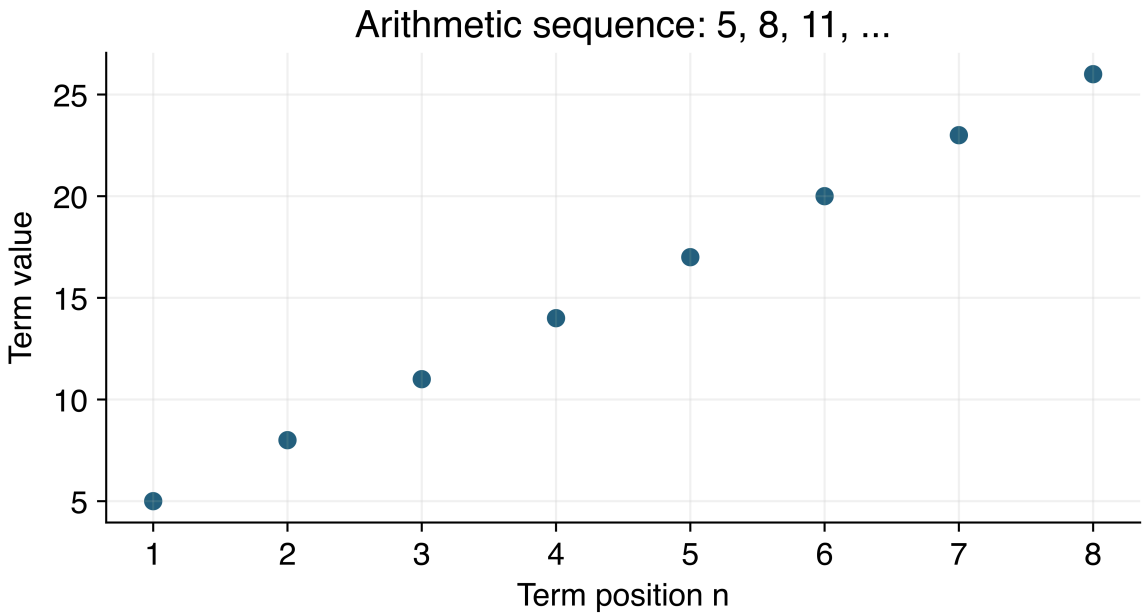
Sequences

Objective

Generate sequences from term-to-term and position-to-term rules; use triangular, square and cube sequences; find linear and quadratic nth terms (rows A24–A26 with the Extension quadratic-sequence addition).

1 Key knowledge and worked examples

nth terms. Arithmetic: $an + b$. Quadratic (Extension): second differences constant; $a = \frac{1}{2}$(second difference). For $5, 9, 17, 29, 45$: differences $4, 8, 12, 16$, second difference 4, so $a = 2$; subtracting $2n^2$ leaves $3, 1, -1, -3, -5 = -2n + 5$: nth term $2n^2 - 2n + 5$.



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

2 Practice

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

2.2 Find the nth term of $4, 7, 12, 19, 28, \ldots$ [3]

2.3 Find the nth term of $6, 11, 18, 27, 38, \ldots$ [3]

2.4 Which square number follows 144? [1]

3 Exam-style questions

3.1 *(Original, quadratic-sequence family.)* A sequence has nth term $3n^2 - 2n$. (a) Write down the first four terms. (b) Which term of the sequence equals 133? [4]

3.2 *(Original.)* The first differences of a sequence are $5, 9, 13, 17, \ldots$. (a) Find the next two differences. (b) Given the first term is 3, write the first four terms. (c) Find the nth term. [5]

3.3 *(Original, specification line not sampled: variation.)* y varies directly as the square of x; $y = 48$ when $x = 4$. (a) Find the equation. (b) Find y when $x = 7$. [4]