

2.1 Change in Arithmetic and Geometric Sequences

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS sequence 数列 • geometric sequence 等比数列 • arithmetic sequence 等差数列 • common difference 公差
• common ratio 公比

Objective

Build the skills to answer exam questions on **change in arithmetic and geometric sequences**.

You must be able to:

- use the **common difference** 公差 of an arithmetic sequence
- use the **common ratio** 公比 of a geometric sequence
- write the n -th term of each

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Arithmetic sequences

A constant **common difference** d is added each step: $a_n = a_1 + (n - 1)d$.

■ Geometric sequences

A constant **common ratio** r is multiplied each step: $g_n = g_1 \cdot r^{n-1}$.

■ Example

3, 7, 11, 15, ... has $d = 4$; 2, 6, 18, 54, ... has $r = 3$.

2 Practice

2.1 State the common difference of 3, 7, 11, 15, ... [1]

2.2 State the common ratio of 2, 6, 18, 54, ... [1]

2.3 Find the 5-th term of an arithmetic sequence with $a_1 = 4$, $d = 3$. [2]

3 Exam-style questions

3.1 An arithmetic sequence has a constant [1]

- **A** ratio
 - **B** difference
 - **C** product
 - **D** sum
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3.2 A geometric sequence has a constant [1]

- **A** difference
 - **B** ratio
 - **C** sum
 - **D** second difference
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3.3 A geometric sequence has $g_1 = 5$ and $r = 2$.

(a) State the 2nd term. [1]

(b) State the 3rd term. [1]

(c) Write the formula for g_n . [1]

Solutions

2.1 $d = 4$.

2.2 $r = 3$.

2.3 $a_5 = 4 + (5 - 1)(3) = 4 + 12 = 16$.

3.1 B.

3.2 B.

3.3 (a) 10. (b) 20. (c) $g_n = 5 \cdot 2^{n-1}$.