

**YEAR 7**

## Sequences and Rules

Three sections. Section A is spotting the rule, section B is the  $n$ th term in both directions, and section C is the same idea dressed up as a situation. Write an  $n$ th term as an expression, not a sentence.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_

### A. Spotting the rule

*Find the difference between one term and the next, then check it is the same difference the whole way along.*

- 1 Write the next term: 3, 7, 11, 15, 19, ...  
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- 2 Write the next term: 7, 12, 17, 22, 27, ...  
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- 3 Write the next term: 100, 92, 84, 76, 68, ...  
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- 4 Write the next term: 2, 11, 20, 29, 38, ...  
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- 5 Write the next term: 45, 39, 33, 27, 21, ...  
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- 6 Write the next term: 12, 19, 26, 33, 40, ...  
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- 7 What is the term-to-term rule for 5, 8, 11, 14, ...?  
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- 8 What is the term-to-term rule for 80, 73, 66, 59, ...?  
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### B. The $n$ th term

*The number in front of  $n$  is the common difference. The rest is whatever gets you back to the first term.*

9 The  $n$ th term of a sequence is  $3n + 1$ . Find the 10th term.

10 The  $n$ th term of a sequence is  $4n - 2$ . Find the 10th term.

11 The  $n$ th term of a sequence is  $5n$ . Find the 10th term.

12 The  $n$ th term of a sequence is  $2n + 7$ . Find the 10th term.

13 The  $n$ th term of a sequence is  $10n - 3$ . Find the 10th term.

14 The  $n$ th term is  $6n + 2$ . Write the first three terms.

15 The  $n$ th term is  $7n - 4$ . Write the first three terms.

16 Find the  $n$ th term of 5, 9, 13, 17, ...

17 Find the  $n$ th term of 1, 4, 7, 10, ...

18 Find the  $n$ th term of 8, 13, 18, 23, ...

### C. Rules in use

*A fixed starting amount plus a fixed amount each time is a linear rule, however the question is worded.*

19 A pattern uses 4 sticks for 1 square, 7 sticks for 2 squares and 10 sticks for 3 squares. How many sticks are needed for 5 squares?

20 Using that same pattern, write the  $n$ th term for the number of sticks.

21 A taxi charges £3.00 plus £2.00 a mile. What does a 7 mile journey cost?

22 Using that same taxi, write a rule for the cost of  $n$  miles.

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23 Sam has £120.00 and spends £8.00 each week. How much is left after 6 weeks?

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24 Is 3, 6, 12, 24, ... an arithmetic sequence? Explain your answer.

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25 The  $n$ th term of a sequence is  $5n + 2$ . Explain why 100 cannot be a term in it.

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