

Sequences and nth terms

Pearson Edexcel GCSE Mathematics 1MA1 • L023
Foundation and Higher • 60 minutes • Lesson resources

REACH FOR THE STAR | GCSE MATHEMATICS

Generate and recognise sequences. Find a linear nth-term rule and use it to decide whether a value belongs.

Work without a calculator except where a check is invited. Write on the lines or replace them with typed answers. Attempt before reading intentional practice feedback.

Connect & Check

Term: number in a sequence. Position: index n , starting at 1 here. Arithmetic: constant difference. Geometric: constant multiplier. Fibonacci type: add the previous two terms.

R1

Continue 4,7,10,13.

R2

Evaluate $3n+2$ for $n=4$.

R3

Solve $3n+2=20$.

Share | In pairs, predict the first step for this problem: For an arithmetic sequence, dn supplies the constant difference d . Compare the first term with d to find the adjustment. Thus $5, 8, 11, \dots$ is $3n+2$. A term-to-term rule generates the Compare your reasons before using the worked model.

Present through worked examples

For an arithmetic sequence, dn supplies the constant difference d . Compare the first term with d to find the adjustment. Thus $5, 8, 11, \dots$ is $3n+2$. A term-to-term rule generates the next term; an n th-term rule finds any position directly.

D1

Model: $5, 8, 11, \dots$ compares with $3, 6, 9, \dots$, so n th term $3n+2$. Find the rule for $7, 10, 13, \dots$.

D2

Model: $10, 8, 6, \dots$ has rule $12-2n$. Find the rule for $9, 6, 3, 0, \dots$.

D3

Model: $3n+2=20$ gives $n=6$, so 20 belongs. Does 22 belong to $3n+2$ for positive integer n ?

D4

Model: $2, 4, 8, 16$ doubles; $1, 1, 2, 3, 5$ adds the previous two. Continue $3, 6, 12, \dots$ and $2, 3, 5, 8, \dots$.

Apply with less support

Inspect differences and ratios before choosing a pattern. For linear sequences write $dn+c$, use $n=1$ to find c and test more terms. To test membership, solve for n and require a positive integer.

A1

Find n th terms for 2,5,8,...; 5,8,11,...; 8,11,14,... . Explain what stays the same.

A2

For n th term $4n-1$, find terms 1,5,20 and decide whether 42 occurs.

A3

A row of n joined squares uses $3n+1$ matchsticks. Find sticks for 12 squares and squares for 31 sticks.

Optional support: Compare each with $3n$.

Optional check after A2: calculate $4 \times 20 - 1 = 79$ and $(42+1) \div 4 = 10.75$. A non-integer answer does not become a sequence position by rounding.

Apply and extend reasoning

C1

Does a constant first difference prove a displayed finite list continues linearly forever? Explain the assumption.

C2

Compare 1,4,9,16,... with 2,5,10,17,... . Give next terms and explain the connection.

Intentional practice feedback — read after attempting

A1: $3n-1$; $3n+2$; $3n+5$.

A2: 3,19,79; no, $n=43/4$ is not an integer.

A3: 37 sticks; 10 squares.

C1: No. Many continuation rules can fit a finite list. A linear rule is an intended model unless specified.

C2: 25 and 26. The second adds 1 to each square.

Correct one response and explain your change. Stretch is available to either tier; temporary support needs do not determine entry tier.

Recall & Review through retrieval

Work without notes. Six retrieval points; this attempt does not establish mastery. Equivalent exact numeric forms are accepted. Where accuracy is requested, also state the requested form in your written work.

Q1 Next term: 5,8,11,14

Q2 Fifth term of $3n+2$

Q3 Coefficient d in 7,10,13,... rule $dn+c$

Q4 c in the same rule $3n+c$

Q5 Position of 20 in $3n+2$

Q6 Next term: 2,3,5,8

Intentional retrieval feedback

Q1 17; Q2 17; Q3 3; Q4 4; Q5 6; Q6 13. Correct and retry tomorrow, then in one week.

Prove independently and improve

P1–P2: five minutes without notes; 4 marks. Your teacher reviews explanations and method marks.
P3 has no mark.

P1

Find the n th term of 6, 10, 14, ... with first position $n=1$. Explain the adjustment. [2]

P2

Does 35 occur in $4n+2$ for positive integer n ? Show why. [2]

P3

Explain one corrected error. Set a fresh question and a date to check it without support.

Teacher feedback: _____

Fresh question and retry date: _____

Delayed independent evidence: _____

Prepare for the next lesson

L024: Cumulative checkpoint and feedback

F1

Tomorrow find the n th term of 3, 7, 11, ... and its tenth term.

F2

Before L024, choose one earlier error in fractions, ratio or algebra. Write a fresh question to test the repaired method.

Read and prepare

A checkpoint selects the next teaching step. Try without prompts, identify whether an error concerns units, operations, signs or structure, then practise a new question before rechecking after a delay.

Digital workbook: save locally where available; export a JSON backup before closing or moving the file. Restore only this lesson/version. Printing records answers, not mastery. Live browser checks remain pending; use Word/PDF if required.

Optional extension activities

Allow 10–15 minutes for learners who have secured the main practice. Show a method, explain a check and justify your conclusion.

Stretch

Find n th term of 4, 9, 14, 19, ... and its 25th term.

Deep challenge

Can 7, 11, 15, 19, ... contain 100? Justify algebraically.

Recall & Review: feedback and extension integration

Lesson L023: Sequences and n th terms

Objective: Generate and recognise sequences. Find a linear n th-term rule and use it to decide whether a value belongs.

Timing for a 60-minute lesson

0-7 Connect & Check; 7-14 Share; 14-25 Present/model; 25-44 Apply route choice/practice; 44-52 independent exam-style check; 52-60 Recall & Review, WWW/EBI and next step.

Recall & Review evidence

At the end of the lesson, solve a fresh question without prompts, explain one check, correct one error and record the next practice step.

What Went Well (WWW)

I represented the algebraic structure accurately, kept each transformation valid and checked the result by substitution, graph or equivalent reasoning.

Even Better If (EBI)

I will show the missing inverse operation or algebraic step, keep signs and brackets accurate and test the result in the original relationship.

Integrated stretch and deep challenge

Stretch: Find n th term of 4,9,14,19,... and its 25th term.

Deep challenge: Can 7,11,15,19,... contain 100? Justify algebraically.

My next-step response