

Finding a quadratic nth term

Pearson Edexcel GCSE Mathematics 1MA1 • L023

Higher-only content • 10-minute alternative route • Lesson resources

REACH FOR THE STAR | GCSE MATHEMATICS

Higher route: replace the 2-minute A3 feedback and the two 4-minute Challenge discussions with this 10-minute taught extension. Retain core P1–P2. Set HX1–HX2 as the final four minutes of that alternative, and use the shared challenges later if needed. The core route remains 60 minutes; the extension is not an additional compulsory ten minutes. Route choice reflects tier curriculum, not temporary support needs.

Discover through a worked example

For 3, 6, 11, 18, 27 the first differences are 3, 5, 7, 9 and second differences are all 2. For a quadratic sequence an^2+bn+c , the constant second difference is $2a$. Thus $a=1$. Subtract n^2 : the remainders are 2, 2, 2, 2, 2. The rule is n^2+2 . Check $n=1$ and $n=4$: 3 and 18. This finds the quadratic rule under a quadratic-pattern assumption; a finite list alone cannot prove a unique continuation.

H1

For 4, 7, 12, 19, 28, subtract n^2 term by term. Find the quadratic nth term.

Optional scaffold: Use squares 1,4,9,16,25.

H2

For 3, 9, 19, 33, 51, the second difference is 4. Subtract $2n^2$. Find the rule and check $n=3$.

Optional scaffold: The coefficient of n^2 is half the second difference.

Apply and prove independently

Four marks. Show working. Your teacher reviews the reasoning; these answers are not automatically marked.

HX1

Find the quadratic nth term for 5, 8, 13, 20, 29. Show a method. [2]

HX2

A learner says 3, 7, 13, 21, 31 has rule n^2+2 . Explain why this fails and give a quadratic rule that matches. [2]

Next step

Record which step needs practice. Retry a fresh example after a delay. A completed task does not establish mastery.