Guide to:
Quadratic sequences

maths Links

Explanation:

A quadratic sequence has nth term $\mathbf{an^2 + bn + c}$ and a constant **second difference**. Work out the first differences and second differences between terms, then halve the second difference to find **a** (since 2a = 2nd difference).

Write out the values of $\mathbf{an^2}$ for n = 1, 2, 3, 4 and subtract them from the original sequence. The remaining numbers form a simple linear sequence **bn + c**; find its nth term and combine with an^2.

Example 1: Find the nth term of 4, 11, 22, 37, 56, ...

Solution:

1st diffs: +7, +11, +15, +19 ⇒ 2nd diff = **+4**

a = 4 ÷ 2 = **2**, so sequence contains $\mathbf{2n^2}$

Subtract $2n^2$ (2, 8, 18, 32) from (4, 11, 22, 37):

Remainder sequence is **2, 3, 4, 5** ⇒ nth term is **n + 1**

Answer: $\mathbf{2n^2 + n + 1}$

Example 2: A sequence has nth term $3n^2 - 2n - 5$. Is 128 a term in this sequence?

Solution:

Set $3n^2 - 2n - 5 = 128 \Rightarrow 3n^2 - 2n - 133 = 0$

Factorise: $(3n + 19)(n - 7) = 0$

n = **7** or $n = -\frac{19}{3}$

Since n = 7 is a positive integer, 128 is the 7th term.

Answer: Yes, it is the 7th term (n = 7)

Worksheets and other links					
Video Lesson on this topic	Video		**1st Class Maths**	Qs	Ans
Ken Stafford (Past Paper Qs)	Qs	Ans	**Naiker Maths**	Qs	Ans
Maths Genie	Qs	Ans	**Dr Austin Maths**	Qs	Ans
Corbettmaths (Practice)	Qs	Ans	**Maths Made Easy**	Qs	Ans
Corbettmaths (Textbook)	Qs	Ans	**Maths4Everyone**	Qs	Ans
Ken Stafford (Worksheet)	Qs	Ans	**Metatutor**	Qs	Ans

Questions by topic | **Past Papers** | **Maths worksheets**

Buy workbook | **Quizzes** | **More resources like this**

ken@mathslinks.co.uk