



Sequences and the n th term

About 45 minutes No calculator 39 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks]

Find the value of $-p^2 - pq$ when $p = -6$ and $q = 3$.

Answer

A2 From chapter 2 [2 marks]

Work out $1\frac{3}{4} \div 1\frac{3}{7}$. Give your answer as a mixed number in its simplest form.

Answer

- A3** Last lesson [2 marks]

A line of best fit for price in pounds (x) and number sold (y) passes through (2, 51) and (10, 63). Use it to estimate y when $x = 8$.

Answer

A4 Key Stage 3 [2 marks]

Work out $23.8 \div 0.07$.

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Find the n th term of the sequence 4, 10, 16, 22, ...

Hint They go up by 6: compare with $6n$.

- B1** Find the n th term of the sequence 3, 14, 25, 36, ... [2 marks]

Answer

EXAMPLE 2

The n th term is $6n + 4$. Is 150 a term? Find the first term greater than 150.

Hint Solve $6n + 4 = 150$: is n whole?

- B2** The n th term is $8n - 5$. Is 125 a term? Find the first term greater than 125. [3 marks]

C Practice

- C1** Write down the first three terms of the sequence with n th term $11 - 4n$. [2 marks]
- C2** Find the n th term of the sequence 47, 42, 37, 32, ... [2 marks]

Answer

Answer

- C3** Which term of the sequence with n th term $3n + 11$ is equal to 95? [2 marks]
- C4** Write down the next two terms of the sequence 2, 5, 11, 20, ... [2 marks]

Answer

Answer

- C5** The 4th term of a linear sequence is 31 and the 11th term is 87. Find the n th term. [3 marks]
- C6** Sequence A has n th term $5n + 17$. Sequence B has n th term $8n - 4$. Find the position at which the two sequences have the same term, and that term. [3 marks]

Answer

Answer position , term

D Exam-style questions

- D1** The n th term of a sequence is $6n - 1$. Sam says, "Every term of this sequence is odd, so 85 must be a term." [2 marks]

Show that Sam is wrong.

- D2** A gym charges a joining fee and then the same amount each month. After 1 month a member has paid £58 in total, after 2 months £81 and after 3 months £104.
- (a) Find an expression, in terms of n , for the total paid after n months. [2 marks]

Answer

- (b) Write down the joining fee. [1 mark]

Answer

- (c) One member has paid £541 in total. For how many months has she been a member? [2 marks]

Answer

- (d) After how many months does the total paid first go over £800? You must show your working. [2 marks]

Answer

Total for D2: 7 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** How many numbers less than 100 are terms of both the sequence with n th term $4n + 1$ and the sequence with n th term $6n + 3$? [3 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Write out the first few terms of each sequence and look for numbers in both.
- Hint 2** $4n + 1$: 5, 9, 13, 17, 21, ... and $6n + 3$: 9, 15, 21, 27, ... — the shared terms are 9, 21, 33, ...
- Hint 3** The shared terms go up by 12, so they are $12n - 3$. $12n - 3 < 100$ gives $n \leq 8$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can continue a sequence and write down terms from an n th term rule. ☐ ☐ ☐
- I can find the n th term of a linear sequence. ☐ ☐ ☐
- I can use the n th term to decide whether a number is a term and to find the first term past a value. ☐ ☐ ☐