

Non-Calculator Questions

Sequences

Introduction to Sequences / nth Terms of Linear Sequences / Quadratic Sequences
/ Other Sequences

Easy (4 questions)	/7
Medium (9 questions)	/29
Hard (6 questions)	/21
Very Hard (3 questions)	/28
Total Marks	/85

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Easy Questions

- 1 These are the first five terms in a sequence.

8 11 14 17 20

Find the next term.

(1 mark)

- 2 The n th term of a number sequence is $n^2 + 1$

Write down the first three terms of the sequence.

(2 marks)

- 3 Write an expression for the n th term of the sequence below.

15 12 9 6

(2 marks)

- 4 A sequence has n th term $2n^2 + 5n - 15$.

Find the difference between the 4th term and the 5th term of this sequence.

(2 marks)

Medium Questions

1 (a) In a sequence

$$T_1 = 17 \quad T_2 = 12 \quad T_3 = 7 \quad T_4 = 2.$$

Find T_5

(1 mark)

(b) Find T_n .

(2 marks)

2 (a) The n th term of a sequence is $60 - 8n$. Find the largest number in this sequence.

(1 mark)

(b) Here are the first five terms of a different sequence.

12 19 26 33 40

Find an expression for the n th term of this sequence.

[2]

(2 marks)

3 Here is a sequence of numbers.

7, 5, 3, 1, -1, ...

Find an expression for the n th term of this sequence.

(2 marks)

4 These are the first four terms of a sequence.

5	8	11	14
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i) Write down the next term.

[1]

ii) Find an expression, in terms of n , for the n th term.

[2]

(3 marks)

5 (a)

19,	15,	11,	7,	
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Write down the next two terms of the sequence.

(2 marks)

(b) Find the n th term of this sequence.

[2]

(2 marks)

(c) Find the value of n when the n th term is -65.

$n = \dots\dots\dots$

(2 marks)

6 These are the first five terms in a sequence.

8 11 14 17 20

Find an expression for the n th term.

(2 marks)

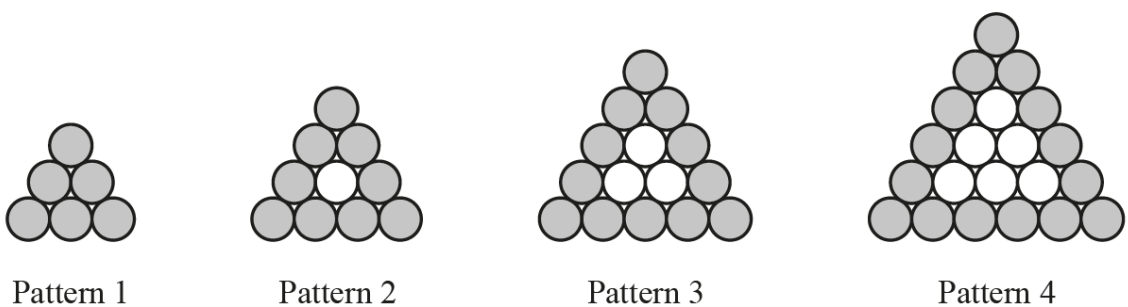
7 These are the first five terms of a sequence.

-4 2 8 14 20

Find an expression for the n th term of this sequence.

(2 marks)

8 (a) Marco is making patterns with grey and white circular mats.



The patterns form a sequence. Marco makes a table to show some information about the patterns.

Pattern number	1	2	3	4	5
Number of grey mats	6	9	12	15	
Total number of mats	6	10	15	21	

Complete the table for Pattern 5.

(2 marks)

(b) Find an expression, in terms of n , for the number of grey mats in Pattern n .

(2 marks)

(c) Marco makes a pattern with 24 grey mats. Find the total number of mats in this pattern.

(2 marks)

9 Find an expression for the n th term of the sequence below.

11, 7, 3, -1, ...

(2 marks)

Hard Questions

1 $\frac{1}{3}, \frac{3}{4}, \frac{4}{7}, \frac{7}{11}, \frac{11}{18}, \dots$

i) One term of this sequence is $\frac{p}{q}$.

Find, in terms of p and q , the next term in this sequence.

[1]

ii) Find the 6th term of this sequence.

[1]

(2 marks)

2 These are the first five terms of a sequence.

$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{6}$	$\frac{13}{8}$	$\frac{21}{10}$
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Find the next term.

(1 mark)

3 Find the next term and the n th term of this sequence.

$\frac{3}{5}, \frac{4}{7}, \frac{5}{9}, \frac{6}{11}, \frac{7}{13}, \dots$

Next term =

n th term =

(3 marks)

4 (a) The n th term of a sequence is given by $an^2 + bn$ where a and b are integers.

The 2nd term of the sequence is -2

The 4th term of the sequence is 12

Find the 6th term of the sequence.

(4 marks)

(b) Here are the first five terms of a different quadratic sequence.

0 2 6 12 20

Find an expression, in terms of n , for the n th term of this sequence.

(2 marks)

5 (a) Find the n th term of each sequence.

4, 8, 12, 16, 20,

(1 mark)

(b) 11, 20, 35, 56, 83,

(2 marks)

6 (a) Here are the first six terms of a Fibonacci sequence.

1 1 2 3 5 8

The rule to continue a Fibonacci sequence is,

the next term in the sequence is the sum of the two previous terms.

Find the 9th term of this sequence.

(1 mark)

(b) The first three terms of a different Fibonacci sequence are

a b $a + b$

Show that the 6th term of this sequence is $3a + 5b$

(2 marks)

(c) Given that the 3rd term is 7 and the 6th term is 29,

find the value of a and the value of b .

(3 marks)

Very Hard Questions

1 (a)

Sequence	1st term	2nd term	3rd term	4th term	5th term		n th term
A	13	9	5	1			
B	0	7	26	63			
C	$\frac{7}{8}$	$\frac{8}{16}$	$\frac{9}{32}$	$\frac{10}{64}$			

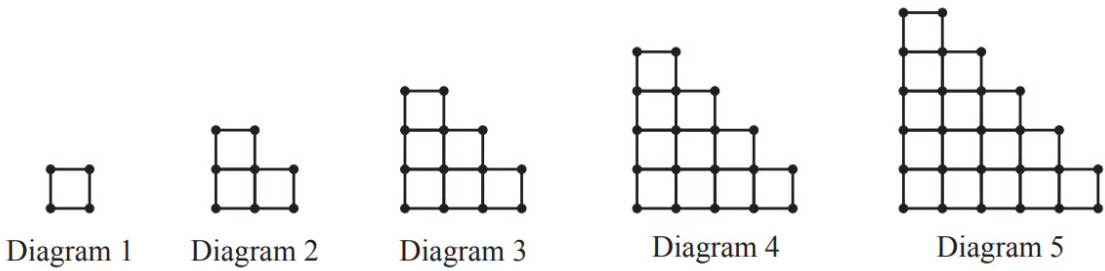
Complete the table for the three sequences.

(10 marks)

- (b) One term in Sequence C is $\frac{p}{q}$. Write down the next term in Sequence C in terms of p and q .

(2 marks)

2 (a)



The sequence of diagrams above is made up of small lines and dots.

Complete the table.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6
Number of small lines	4	10	18	28		
Number of dots	4	8	13	19		

(4 marks)

(b) For Diagram n find an expression, in terms of n , for the number of small lines.

(2 marks)

(c) Diagram r has 10 300 small lines. Find the value of r .

$r = \dots\dots\dots$

(2 marks)

(d) The number of dots in Diagram n is $an^2 + bn + 1$.

Find the value of a and the value of b .

$a =$

$b =$

(2 marks)

3 (a) The table shows the first five terms of sequence A and sequence B .

Term	1	2	3	4	5	6
Sequence A	7	13	23	37	55	
Sequence B	1	3	9	27	81	

Complete the table for the 6th term of each sequence.

(2 marks)

(b) i) Find the n th term of sequence A .

[2]

ii) Find the n th term of sequence B .

[2]

(4 marks)