

1 3, 9, 27, 81, ...

Write down the term to term rule for this sequence.

..... [1]

[Total: 1]

2 13, 17, 21, 25, ...

Find the n th term of this sequence.

..... [2]

[Total: 2]

3 22, 17, 12, 7, 2, ...

(a) Find the next term of the sequence.

..... [1]

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

..... [2]

[Total: 3]

4 A sequence of diagrams is made by joining regular polygons.

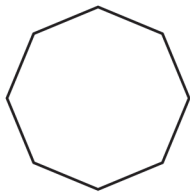


Diagram 1

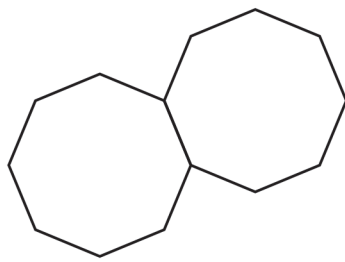


Diagram 2

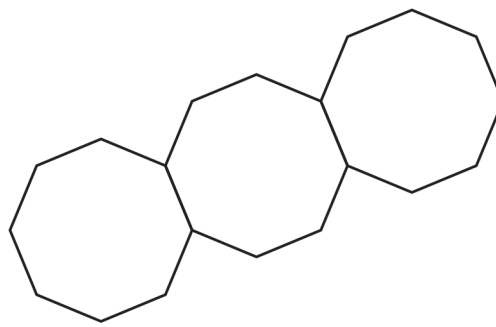


Diagram 3

(a) Complete the table.

Diagram number	1	2	3	4	5
Number of lines	8	15			

[3]

(b) Write down the term to term rule for the number of lines in the sequence.

..... [1]

(c) Work out the number of lines in Diagram 9.

..... [1]

(d) Find an expression, in terms of n , for the number of lines in Diagram n .

..... [2]

- (e) Diagram k has 113 lines.

Find the value of k .

$k = \dots\dots\dots$ [2]

[Total: 9]

- 5 The n th term of a sequence is $n^2 + 12$.

- (a) Find the first three terms of this sequence.

$\dots\dots\dots$, $\dots\dots\dots$, $\dots\dots\dots$ [2]

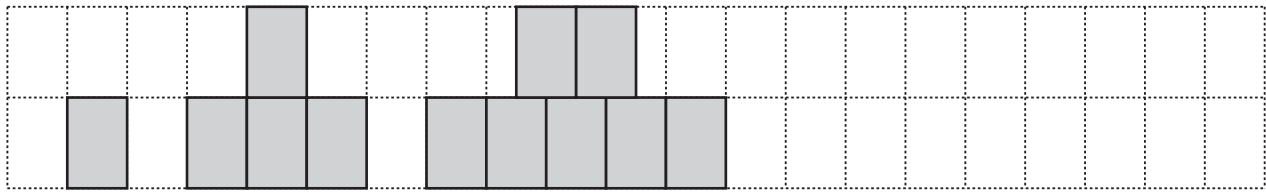
- (b) Is 5196 a term in this sequence?
Give a reason for your decision.

$\dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$ [2]

[Total: 4]

- 6 A sequence of patterns is made using rectangular blocks.



Pattern 1

Pattern 2

Pattern 3

Pattern 4

(a) Draw Pattern 4.

[1]

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of blocks	1	4	7		

[2]

(c) Find an expression, in terms of n , for the number of blocks in Pattern n .

..... [2]

(d) Tara wants to make one pattern in this sequence.
She has 84 blocks.

Work out the largest pattern number she can make and the number of blocks remaining.

Pattern number

Number of blocks remaining [4]

[Total: 9]

7 The grid shows the first three diagrams in a sequence.

Each diagram is made using identical small squares.

Each square has sides that are 1 unit long.

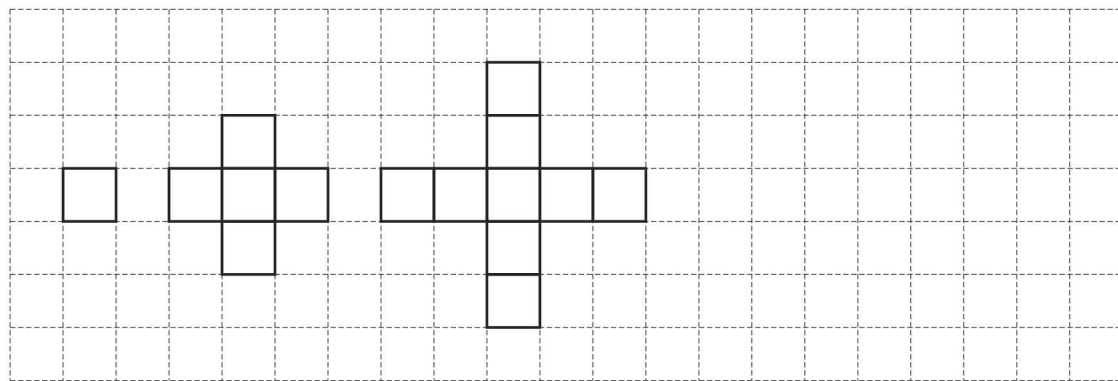


Diagram 1

Diagram 2

Diagram 3

Diagram 4

- (a) On the grid, draw Diagram 4.

[1]

- (b) Complete the table.

Diagram number	1	2	3	4
Perimeter	4	12	20	

[1]

- (c) Find an expression, in terms of n , for the perimeter of Diagram n .

..... [2]

- (d) For one of the diagrams in the sequence the perimeter is 300 units.

Work out its Diagram number.

..... [2]

- (e) **Diagram 3** is drawn on a piece of card.
The side of each small square is 7 cm.
The diagram is the net of an open box.

Calculate the volume of this box.
Give the units of your answer.

..... [3]

[Total: 9]

- 8 Find the n th term of this sequence.

8, 17, 32, 53, 80, ...

..... [2]

[Total: 2]

- 9 The n th term of a sequence is $an^2 + bn - 4$.

The first term is -3 and the second term is 2 .

Find the value of a and the value of b .

$a =$

$b =$ [5]

[Total: 5]

- 10** The n th term of a sequence is $n^2 + 7$.

Find the first three terms of this sequence.

..... , , [2]

[Total: 2]

- 11** These are the first five terms of a sequence.

25 18 11 4 -3

Find the n th term of this sequence.

..... [2]

[Total: 2]

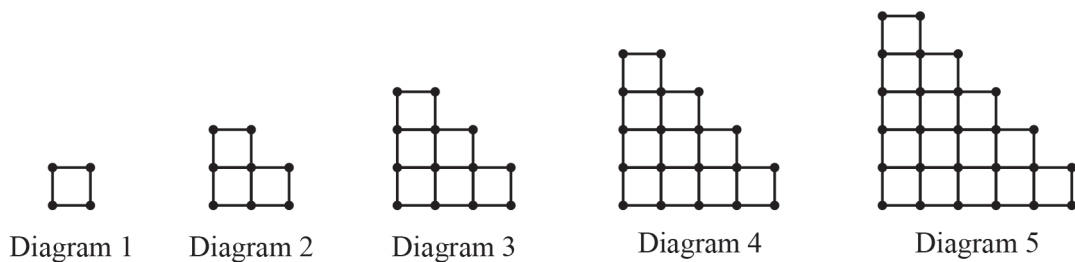
- 12** The n th term of a sequence is $n^2 + 3n$.

Find the first three terms of this sequence.

..... , , [2]

[Total: 2]

13



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

(a) 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]

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

..... [2]

(c) Diagram r has 10 300 small lines.

Find the value of r .

$r =$ [2]

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

Find the value of a and the value of b .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots [2]$$

[Total: 10]

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

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

$$\dots\dots\dots [2]$$

[Total: 2]

- 15 19, 15, 11, 7,

- (a) Write down the next two terms of the sequence.

$$\dots\dots\dots, \dots\dots\dots [2]$$

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

..... [2]

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

$n =$ [2]

[Total: 6]

16 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	

(a) Complete the table for the 6th term of each sequence. [2]

(b) Find the n th term of

(i) sequence A ,

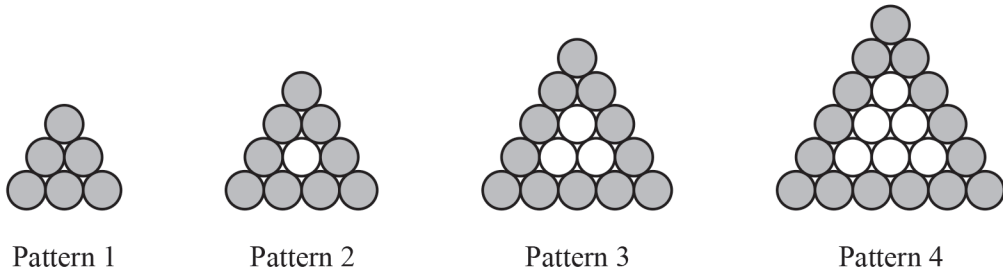
..... [2]

(ii) sequence B .

..... [2]

[Total: 6]

17 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	

(a) Complete the table for Pattern 5.

[2]

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

..... [2]

(c) Marco makes a pattern with 24 grey mats.

Find the total number of mats in this pattern.

..... [2]

- (d) Marco needs a total of 6 mats to make the first pattern.
 He needs a total of 16 mats to make the first two patterns.
 He needs a total of $\frac{1}{6}n^3 + an^2 + bn$ mats to make the first n patterns.

Find the value of a and the value of b .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots [6]$$

[Total: 12]

- 18 The table shows the first five terms of sequences A , B and C .

Sequence	1st term	2nd term	3rd term	4th term	5th term	6th term
A	0	1	4	9	16	
B	4	5	6	7	8	
C	-4	-4	-2	2	8	

- (a) Complete the table. [3]

- (b) Find an expression for the n th term of

- (i) sequence A ,

$$\dots\dots\dots [2]$$

- (ii) sequence B .

$$\dots\dots\dots [1]$$

- (c) Find the value of n when the n th term of sequence A is 576.

$n = \dots\dots\dots$ [2]

- (d) (i) Find an expression for the n th term of sequence C .
Give your answer in its simplest form.

$\dots\dots\dots$ [3]

- (ii) Find the value of the 30th term of sequence C .

$\dots\dots\dots$ [2]

[Total: 13]