

Q1. (a) The rule for the next term of a sequence is

Multiply the previous term by three and subtract one.

The first two terms of the sequence are 2 and 5.

Write down the next **two** terms.

.....
.....

Answer 2 5

(2)

(b) The n th term of a different sequence is $5n$.

The first term is 5

Write down the next **three** terms.

Answer 5

(1)

(c) Work out the n th term of this sequence.

7 10 13 16 19

.....

Answer

(2)

(Total 5 marks)

Q2. The n th term of a sequence is given by the expression $n^2 - 3$

Write down the first three terms of the sequence.

.....
.....

Answer , ,

(Total 2 marks)

Q3. Here are the n th terms of 3 sequences.

Sequence 1	n th term	$4n + 1$
Sequence 2	n th term	$3n + 3$
Sequence 3	n th term	$3n - 1$

For each sequence state whether the numbers in the sequence are

- A Always multiples of 3
- S Sometimes multiples of 3
- N Never multiples of 3

.....

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.....

.....

Answer Sequence 1

Sequence 2

Sequence 3

(Total 3 marks)

Q4. Here is a sequence of numbers

4 7 10 13

(a) Write down the next term in the sequence.

.....

Answer

(1)

(b) Write down the rule for continuing the sequence.

.....

Answer

(1)

(Total 2 marks)

Q5. Billy and Mina are investigating sequences that begin with

1, 2, 4,

(a) Billy says the fourth term is 8

What rule could Billy be using?

.....
.....

Answer

(1)

(b) Mina says the fourth term is 7

What rule could Mina be using?

.....
.....

Answer

(1)

(Total 2 marks)

Q6. This question is about sequences that start 1, 4 ...

(a) Here are the first three terms of a sequence

1 4 16 ...

The rule for continuing this sequence is

Multiply by 4

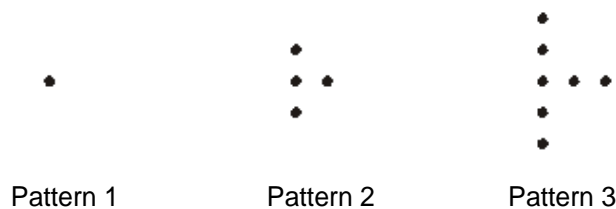
What is the next term?

.....
Answer

(1)

(b) Another sequence uses a pattern of dots.

Here are the first three patterns.



(i) Draw Pattern 4

(1)

(ii) How many dots are in Pattern 5?

.....

Answer

(1)

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

1 4 8 13 19 ...

What is the next term?

.....

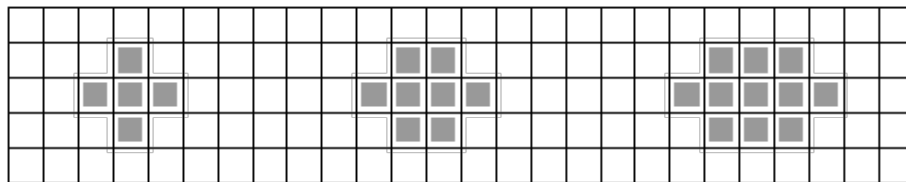
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Answer

(1)

(Total 4 marks)

Q7. Square tiles are used to make patterns on a grid.



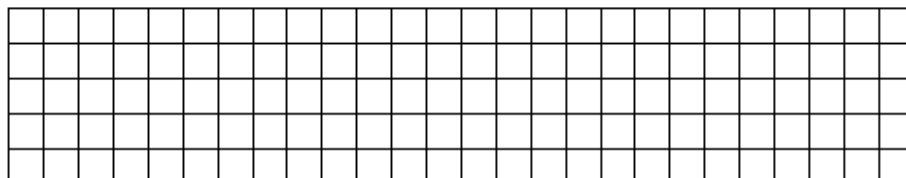
Pattern 1

Pattern 2

Pattern 3

(a) The pattern continues in the same way.

Draw Pattern 4



(1)

(b) (i) Complete this table.

Pattern Number	1	2	3	4	5
Number of tiles	5	8			

(1)

(ii) How many tiles are in Pattern 9?

.....

Answer

(1)

(c) There are 302 tiles in Pattern 100.

How many tiles are in Pattern 99?

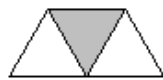
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Answer

(1)

(Total 4 marks)

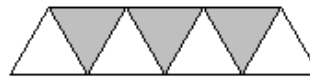
Q8. Here is a sequence of triangle patterns.



Pattern 1



Pattern 2



Pattern 3

Complete the table.

	Pattern 1	Pattern 2	Pattern 3	Pattern 4
Number of shaded triangles	1	2	3	
Total number of triangles	3	5		

(Total 2 marks)

Q9. Each term of a Fibonacci sequence is formed by adding the previous two terms.

1, 1, 2, 3, 5, 8, 13, 21,

A Fibonacci sequence starts $a, b, a + b, \dots$

(a) Use algebra to show that the 6th term of this Fibonacci sequence is $3a + 5b$

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.....
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.....
.....

(2)

(b) Use algebra to prove that the difference between the 9th term and 3rd term of this sequence is four times the 6th term.

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.....
.....

(3)

(Total 5 marks)

Q10. (a) A sequence starts

2 7 17

The rule for finding the next term in this sequence is to multiply the previous term by 2 and then add on 3

Work out the next term.

.....
.....

Answer

(1)

(b) The rule for finding the next term in a different sequence is to multiply the previous term by 2 and then add on a , where a is an integer.

The first term is 8 and the fourth term is 127

8 127

Work out the value of a .

.....
.....
.....
.....
.....
.....
.....

Answer $a =$

(4)

(Total 5 marks)

M1. (a) 14
 41
ft their first answer $\times 3 - 1$

(b) 10, 15, 20

(c) $3n$
 $3n + 4$

B1
 B1 ft
 B1
 M1
 A1
 [5]

M2. -2, 1, 6
*-1 each error or emission.
 Ignore extra terms
 $1^2 - 3, 2^2 - 3, 3^2 - 3$ is B1*

B2
 [2]

M3. S, A, N
-1eeoo

B3
 [3]

M4. (a) 16

(b) Add 3
oe Allow $n + 3$

B1
 B1
 [2]

M5. (a) Term to term rule $\rightarrow \times 2$
*oe eg, double each time
 or one more than the sum of the previous terms*

B1

- (b) Term to term rule \rightarrow + consecutive integers
oe eg, add 1 more each time
or sum of previous 3 terms

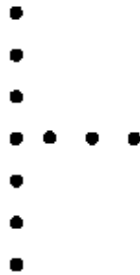
B1

[2]

M6. (a) 64

B1

(b) (i)



B1

(ii) 13

B1

(c) 26

B1

[4]

M7. (a) Correct diagram

B1

(b) (i) $3 \rightarrow 11, 4 \rightarrow 14$ **and** $5 \rightarrow 17$

B1

(ii) 29

B1

(c) 299

B1

[4]

M8.

	4
7	9

B1 For two correct

B1

[1]

M9.

(a) $4^{\text{th}} \text{ term} = a + 2b$

or ($a = 1$ and $b = 1$ and)

$$3(1) + 5(1)$$

oe Accept $5^{\text{th}} \text{ term} = 2a + 3b$ (oe) for M1 if 4^{th} term not seen.

M1

$$6^{\text{th}} \text{ term} = 2a + 3b(+)a + 2b$$

Must see 4^{th} and 5^{th} terms

A1

(b) Continuing sequence to 9^{th} term

$$= 3a + 5b, 5a + 8b, 8a + 13b, 13a + 21b$$

Must come from continuing sequence and not from $4 \times 6^{\text{th}} - 3^{\text{rd}}$

M1

$$13a + 21b - (a + b) = 12a + 20b$$

Allow subtraction to be 'assumed'. Condone missing bracket if answer correct

A1

$$12a + 20b = 4(3a + 5b)$$

Either way round, expansion or factorisation

A1

[5]

M10. (a) 37

B1

(b) $16 + a$

$$(127 - a) \div 2$$

B1

2 x their $(16 + a) + a$

$$32 + 3a, 2(16 + a) + a$$

M1

2 x their $(32 + 3a) + a = 127$

$$\text{oe } 64 + 7a = 127$$

M1

$(a =) 9$

A1

Alternate method

Evidence of multiplying 8 by 2 and adding any number

Evidence of subtracting a number from 127 and dividing by 2

M1

Evidence of multiplying their answer by 2 and adding **the same** number

Evidence of subtracting the same number from their answer and dividing by 2

M1

Refined attempt

M1

$(a =) 9$

A1

[5]

