Non-Calculator

Q1.

A sequence has three terms.
The term-to-term rule for the sequence is

multiply by 8 and then add 11

(a)   The first term of the sequence is −1

Work out the third term.

_____

_____

_____

_____

_____

Answer _____

(2)

(b)   The order of the three terms is reversed to make a new sequence.

Work   out   the   term-to-term   rule   for   this   sequence.

_____

_____

Answer _____

(1)
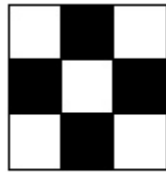(Total 3 marks)

AQA GCSE Maths - Sequences (F)
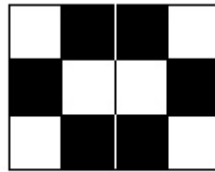
Q2.

A sequence of patterns uses black squares and white squares.
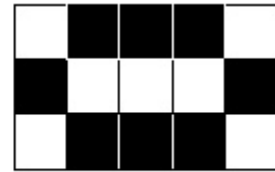
Here are the first three patterns.

Pattern 1   Pattern 2   Pattern 3

(a) Circle the expression for the number of black squares in Pattern n.

$4n$ $n + 2$ $6n - 2$ $2n + 2$

(1)

(b) Will the number of black squares always be even?

Tick a box.

Yes ☐   No ☐

Give a reason for your answer.

_____

_____

(1)

(Total 2 marks)

AQA GCSE Maths - Sequences (F)

Q3.

The first three terms of a sequence are

$$a \qquad b \qquad c \qquad \ldots$$

The term-to-term rule of the sequence is

> Multiply by 2 and subtract 4

Show that $c = 4(a - 3)$

_____

_____

_____

_____

_____

_____

(Total 4 marks)

Q4.

Here are the first three lines of a number pattern.

Line 1 $\qquad 2 \times 2 - 2 \times 1^2 = 2$

Line 2 $\qquad 4 \times 3 - 2 \times 2^2 =$

Line 3 $\qquad 4\ 6 \times 4 - 2 \times 3^2$

(a) Write down Line 4 of the pattern.

Line 4 _____ = _____

(2)

(b) Which line of the pattern is this?

Line _____ $\qquad 38 \times 20 - 2 \times 19^2 = 38$

(1)

(c) Line n $\qquad 2n(n + 1) - 2n^2 = 2n$

Show how $2n(n + 1) - 2n^2$ simplifies to $2n$

_____

_____

_____

(1)

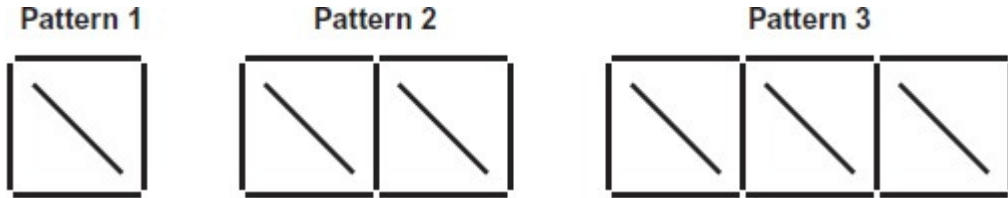(Total 4 marks)

AQA GCSE Maths - Sequences (F)

Q5.

Write down the next two terms in the sequence.

2   9   16   23   ____   ____

(Total 2 marks)

Q6.

This sequence of patterns is made using sticks.

Pattern 1   **Pattern 2**   **Pattern 3**

(a)   Complete the table for Pattern 4 and Pattern 5

Pattern	1	2	3	4	5
Number of sticks	5	9	13		

(1)

(b)   Work out the nth term of the sequence   9   13   ...

_____

_____

Answer _____

(2)

(c)   Which pattern is made using 53 sticks?

_____

_____

_____

Answer _____

(2)

(Total 5 marks)

AQA GCSE Maths - Sequences (F)

Q7.

Here is a linear sequence.

46   40   34   28   22   ___

Work out the nth term of the sequence.

_____

_____

Answer _____

(Total 2 marks)

Q8.

(a)   Here are the fourth and fifth terms of a Fibonacci-type sequence.

....   28   43

Each term is the sum of the previous two terms. Show that the first term is

2   _____

_____

_____

_____

(2)

(b)   Here are the first and third terms of a different Fibonacci-type sequence.

a .... b ....

Each term is the sum of the previous two terms.

Work out an expression in terms of a and b for the fifth term.

_____

_____

_____

_____

Answer _____

(3)

(Total 5 marks)

AQA GCSE Maths - Sequences (F)

Q9.

The nth term of a sequence is $2n + 3$

The nth term of a different sequence is $3n - 1$

Work out the three numbers that are

    in both sequences

    and

    between 20 and 40

_____

_____

_____

_____

_____

_____

Answer _____, _____, _____

(Total 3 marks)

Q10.

The term-to-term rule for a sequence is

multiply by 2

The sequence starts

a $2a$ ___   ___

The total value of the first three terms is 63 Work out the total value of the first

four   terms.

_____

_____

_____

_____

Answer _____

(Total 3 marks)

AQA GCSE Maths - Sequences (F)

Q11.

(a)   A sequence starts   5   13   21   29

Circle the expression for the *n*th term.

$$8 - 3n \qquad 8n + 5 \qquad 8n - 3 \qquad 5n + 8$$

(1)

(b)   The term-to-term rule for a different sequence is

> Multiply the previous term by 2 then subtract 5

The second term in this sequence is 2*x* + 7

The sum of the first three terms is 57

Work out the value of *x*.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

(4)

(Total 5 marks)

Q12.

Which of these is a geometric progression?

Circle your answer.

2, 4, 6, 8, 10   2, 3, 5, 8, 12

2, 6, 18, 54, 162   2, 6, 10, 14, 18

(Total 1 mark)

AQA GCSE Maths - Sequences (F)

Q13.

Here is a linear sequence.

	5	13	21	29

Circle the expression for the nth term of the sequence.

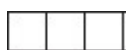$n + 8$ $5n + 8$ $8n$ $8n - 3$
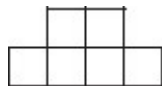
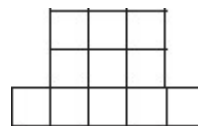(Total 1 mark)

Q14.

Here is a sequence of patterns made with squares.

Pattern 1   Pattern 2   Pattern 3

The rule for working out the number of squares in each pattern is

> Square the pattern number and then add 2

(a) How many squares are in pattern 7?

_____

_____

Answer _____
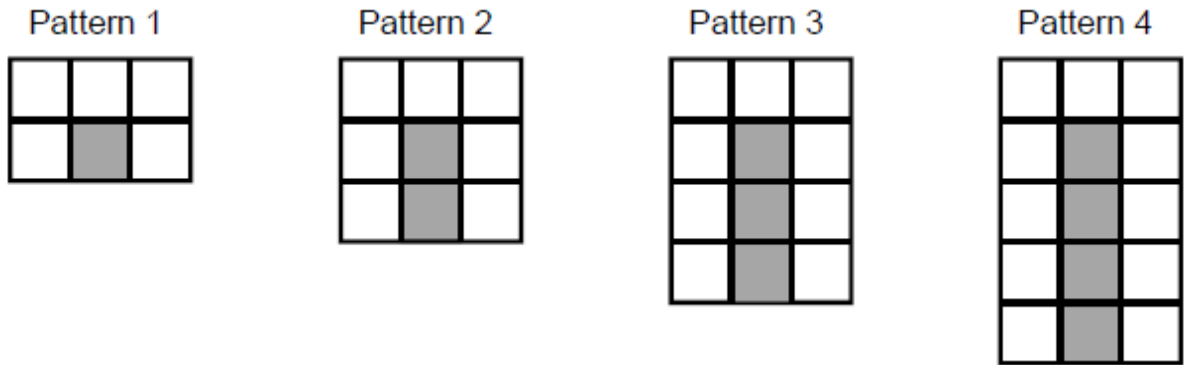
(1)

(b) Which pattern has 123 squares?

_____

_____

Answer _____

(2)

(Total 3 marks)

Q15.

A sequence of patterns uses grey squares and white squares.

Here are the first four patterns.

Pattern 1   Pattern 2   Pattern 3   Pattern 4

(a)   Work out the total number of squares in Pattern 100

_____

_____

_____

_____

Answer _____

(3)

(b)   Complete this number machine for the sequence of patterns.

Number of grey squares → [×] → [+] → Number of white squares

(1)

(Total 4 marks)

AQA GCSE Maths - Sequences (F)
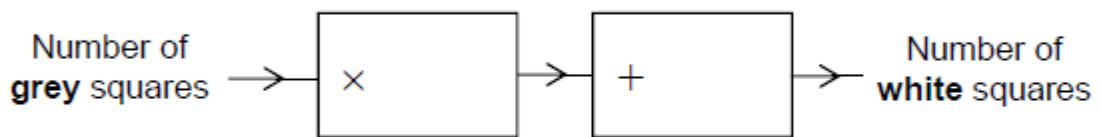
Q16.

Work out the next term of this quadratic sequence.

4   12   24   40   ____

Answer _____

(Total 2 marks)

Q17.

Circle the nth term of the linear sequence 3 7 11 ....

$n + 4$ $3n + 4$ $4n - 1$ $4n + 3$

(Total 1 mark)

Q18.

The first four terms of a sequence are −10   −8   −6   −4

Circle the expression for the nth term of the sequence.

$-12 - 2n$ $-8 - 2n$ $n + 2$ $2n - 12$

(Total 1 mark)

AQA GCSE Maths - Sequences (F)

Q19.

Consecutive numbers in this pattern can be used to change miles to kilometres.

<div align="center">3   5   8   13   21   34</div>

For example 3 miles = 5 kilometres

                5 miles = 8 kilometres and so on.

(a)   Use the pattern to change 13 miles to kilometres.

13 miles = _____ km

(1)

(b)   Use the pattern to change 13 kilometres to miles.

13 km = _____ miles

(1)

(c)   Use the pattern to change 42 miles to kilometres.

_____

_____

42 miles = _____ km

(2)

(d)   Use two values in the pattern to change 18 miles to kilometres.

_____

_____

_____

18 miles = _____ km

(2)

(Total 6 marks)

AQA GCSE Maths - Sequences (F)

Q20.

Here are the first three terms of a sequence.

23   –14   9

Each term is obtained by adding the previous two terms together.

(a)   Work out the next two terms in the sequence.

_____

Answer _____ and _____

(1)

(b)   The sequence continues.

How many negative terms are in the sequence?
Circle your answer.

1   2   3   4   more than 4

Give   a   reason   for   your   answer.

_____

_____

_____

(2)
(Total 3 marks)

Q21.

Work out the next term of this quadratic sequence.

5   8   14   23   ......

Answer _____

(Total 2 marks)

AQA GCSE Maths - Sequences (F)