

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 _____

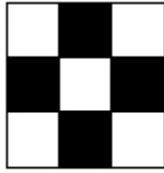
(1)

(Total 3 marks)

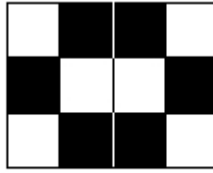
Q2.

A sequence of patterns uses black squares and white squares.

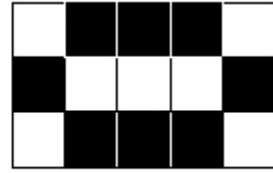
Here are the first three patterns.



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)

Q3.

The first three terms of a sequence are

$$a \quad b \quad c \quad \dots$$

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

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

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

(a) Write down Line 4 of the pattern.

Line 4 _____ = _____ **(2)**

(b) Which line of the pattern is this?

Line _____ $38 \times 20 - 2 \times 19^2 = 38$ **(1)**

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

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

(1)
(Total 4 marks)

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 n th term of the sequence 5 9 13 ...

Answer _____

(2)

(c) Which pattern is made using 53 sticks?

Answer _____

(2)

(Total 5 marks)

Q7.

Here is a linear sequence.

46 40 34 28 22 _____

Work out the n th 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)

Q9.

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

The n th 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)

Q11.

- (a) A sequence starts 5 13 21 29

Circle the expression for the n th term.

$8 - 3n$ $8n + 5$ $8n - 3$ $5n + 8$

(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 $2x + 7$

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)

Calculator

Q13.

Here is a linear sequence.

5 13 21 29

Circle the expression for the n th term of the sequence.

$n + 8$

$5n + 8$

$8n$

$8n - 3$

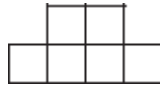
(Total 1 mark)

Q14.

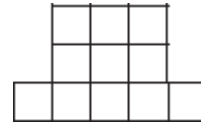
Here is a sequence of patterns made with squares.



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 _____

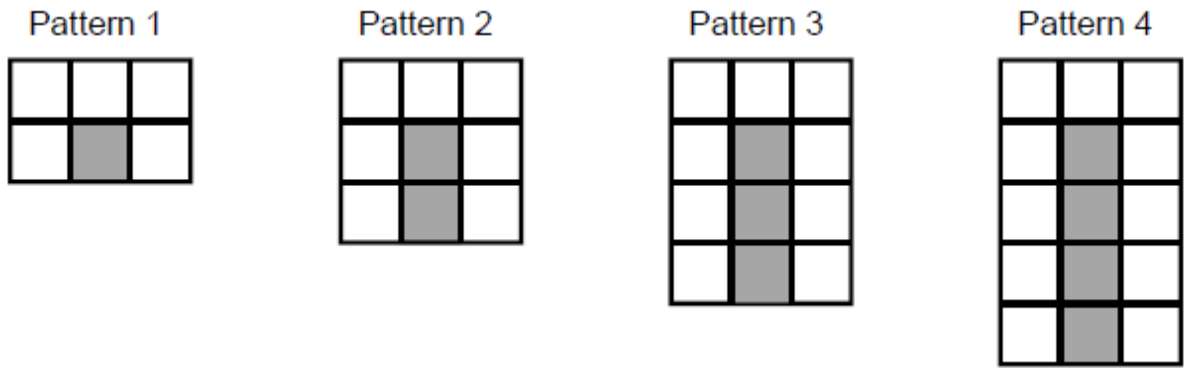
(2)

(Total 3 marks)

Q15.

A sequence of patterns uses grey squares and white squares.

Here are the first four patterns.

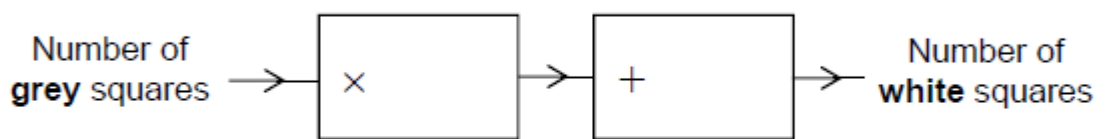


(a) Work out the **total** number of squares in Pattern 100

Answer _____

(3)

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



(1)

(Total 4 marks)

Q16.

Work out the next term of this quadratic sequence.

4 12 24 40 _____

Answer _____

(Total 2 marks)

Q17.

Circle the n th 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 n th term of the sequence.

$-12 - 2n$

$-8 - 2n$

$n + 2$

$2n - 12$

(Total 1 mark)

Q19.

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

3 5 8 13 21 34

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)

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)