Name: _____

GCSE (1 – 9)

Sequences

Instructions

- Use **black** ink or ball-point pen.
- Answer all Questions.
- Answer the Questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each Question are shown in brackets
– *use this as a guide as to how much time to spend on each Question.*

Advice

- Read each Question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every Question.
- Check your answers if you have time at the end

1 Here are the first five terms of a sequence.

2 4 7 11 16

+2 +3 +4 +5

Write down the next two terms in the sequence.

16 + 6 = 22

22 + 7 = 29

22 , 29

(Total for Question 1 is 2 marks)

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2 The first term in a sequence is 3.
The term to term rule is add 5.

3 8 13 18 23 ...

Is 97 a term in the sequence?
Give a reason for your answer.

No, all terms in the sequence end in 3 or 8

(Total for Question 2 is 2 mark)

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3 Here are the first five terms of a Fibonacci sequence

1 2 3 5 8

Write down the next two terms in the sequence.

5 + 8 = 13

8 + 13 = 21

13 , 21

(Total for Question 3 is 2 marks)

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4 The nth term of a sequence is $4n + 3$

(a) Find the first two terms of this sequence.

$4(1) + 3 = 7$

$4(2) + 3 = 11$

7 , 11

(b) Is 35 a term in this sequence.
You must show how you get your answer.

$4n + 3 = 35$

$4n = 32$

$n = 8$

Yes, 35 is the 8^{th} term in the sequence

(Total for Question 4 is 2 marks)

5 The nth term of a sequence is $n^2 + 1$

$(1)^2 + 1 = 2$

$(2)^2 + 1 = 5$

(a) Find the first two terms of this sequence.

2 , 5

(1)

(b) Is 35 a term in this sequence.
You must show how you get your answer.

$n^2 + 1 = 35$

$n^2 = 34$

$n = \sqrt{34}$ [not a whole no.]

No, 35 is not one more than a square number

(1)

(Total for Question 5 is 2 marks)

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6 Here are the first 5 terms of a sequence.

17 14 11 8 5

(a) Find the next term of this sequence.

2

(1)

The nth term of a different sequence is $10n^2 + 5$

$10(5)^2 + 5$

$10(25) + 5$

$250 + 5$

(b) Work out the 5th term of this sequence.

255

(1)

(Total for Question 6 is 2 marks)

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7 Here are the first four terms of a sequence.

7 13 19 25

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

31

(1)

(b) Explain how you got your answer

added 6 onto the previous term

(1)

(Total for Question 7 is 2 marks)

8 Here are the first four terms of a number sequence.

2 3 5 9

The rule to continue the sequence is

multiply the previous term by 2 and then subtract 1

Work out the 5th term of this sequence.

$9 \times 2 = 18$

$18 - 1 = 17$

17

(Total for Question 8 is 1 mark)

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9 Here are the first 5 terms of a Fibonacci sequence.

2 2 4 6 10

Find the 8th term of this sequence.

$6 + 10 = 16$

$10 + 16 = 26$

$16 + 26 = 42$

42

(Total for Question 9 is 2 marks)

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

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

$(1)^2 + 3 = 4$

$(2)^2 + 3 = 7$

$(3)^2 + 3 = 12$

4 , 7 , 12

(2)

(b) Find the 10th term in this sequence.

$(10)^2 + 3$

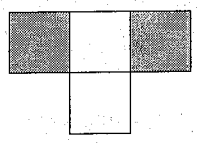
$100 + 3$

103

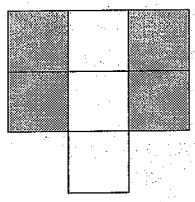
(1)

(Total for Question 10 is 3 marks)

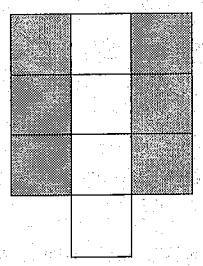
11 Here is a sequence of patterns made from white tiles and grey tiles.



pattern number 1

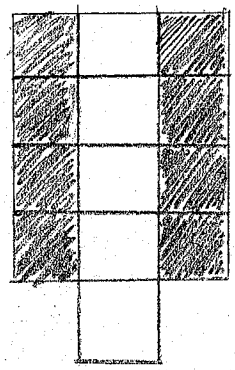


pattern number 2



pattern number 3

(a) In the space below, draw pattern number 4.



(1)

(b) Work out the total number of tiles to make pattern number 7.

4 7 10 13 16 19 22

22

(2)

Kyle says

"There are 4 white tiles in pattern number 3 so there will be 8 white tiles in pattern number 6."

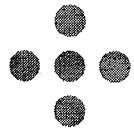
(c) Is Kyle right?
You must give a reason for your answer.

No. There will be 7 white tiles in pattern 6.

(1)

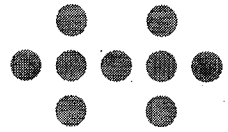
(Total for Question 11 is 4 marks)

12 Here is a sequence of patterns made from grey counters.



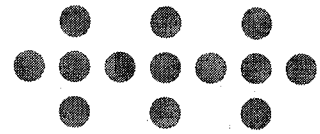
pattern number 1

5



pattern number 2

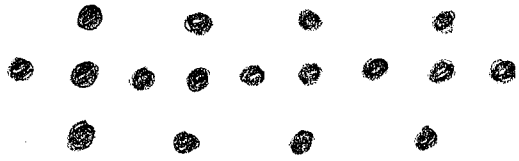
9



pattern number 3

13

(a) In the space below, draw pattern number 4.



(b) Work out the total number of counters to make pattern number 10.

(1)

	5	9	13	17
$4n$	4	8	12	16

$4n + 1$

$4(10) + 1 = 41$

41

(2)

(Total for Question 12 is 3 marks)

13 Here are the first five terms of a sequence.

31 27 23 19 15

(a) Find the first negative term in the sequence.

11 7 3 −1

−1

(2)

(b) Is –30 a term in this sequence?
Give a reason for your answer.

No. All terms in the sequence are odd

(1)

(Total for Question 13 is 3 marks)

14 Here are the first 5 terms of an arithmetic sequence.

-3 1 5 9 13

(a) Find an expression, in terms of n, for the nth term of this sequence.

4n 4 8 12 16 20

4n − 7

(2)

The nth term of a different arithmetic sequence is $2n - 3$

(b) Is 101 a term in this sequence?
Show how you get your answer.

$2n - 3 = 101$

$2n = 104$

$n = 52$

Yes, it is the 52nd term.

(2)

(Total for Question 14 is 4 marks)

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15 Here are the first 5 terms of a sequence.

9 14 19 24 29

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

5n 5 10 15 20 25

5n + 4

(Total for Question 15 is 2 marks)

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16 Here are the first 5 terms of a sequence.

25 22 19 16 13

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

−3n −3 −6 −9 −12 −15

−3n + 28

(Total for Question 16 is 2 marks)

17 Here are the first four terms of an arithmetic sequence.

4 11 18 25

Write down an expression, in terms of n, for the nth term of the sequence.

7n 7 14 21 28

7n − 3

(Total for Question 17 is 2 marks)

18 Here are the first four terms of an arithmetic sequence.

35 31 27 23

Write down an expression, in terms of n, for the nth term of the sequence.

−4n −4 −8 −12 −16

−4n + 39

(Total for Question 18 is 2 marks)

19 Here are the first five terms of an arithmetic sequence.

21 27 33 39 45

Write down an expression, in terms of n, for the nth term of the sequence.

6n 6 12 18 24 30

6n + 15

(Total for Question 19 is 2 marks)

20 Here are the first five terms of an arithmetic sequence.

2 7 12 17 22

Write down an expression, in terms of n, for the nth term of the sequence.

5n 5 10 15 20 25

5n − 3

(Total for Question 20 is 2 marks)