Name: _____

# IGCSE

# 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 5 8 11 14

Write down the next two terms in the sequence.

17 , 20

**(Total for Question 1 is 1 mark)**

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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 end in 3 and 8.

**(Total for Question 2 is 2 marks)**

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**3** Here are the first five terms of a sequence

6 10 14 18 22

Write down the next two terms in the sequence.

26 , 30

**(Total for Question 3 is 2 marks)**

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

$4(1) + 3 = 7$
$4(2) + 3 = 11$

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

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, it is the 8th term.

**(Total for Question 4 is 2 marks)**

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

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

$(1)^2 + 1 = 2$

$(2)^2 + 1 = 5$

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 number)

No

(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 $n$th term of a different sequence is $10n^2 + 5$

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

$10(5)^2 + 5$

$10(25) + 5$

$250 + 5$

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

I added 6 to 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 sequence.

29 24 19 14 9

Find the 8th term of this sequence.

4 −1 −6

−6

**(Total for Question 9 is 2 marks)**

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**10** The $n$th 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.

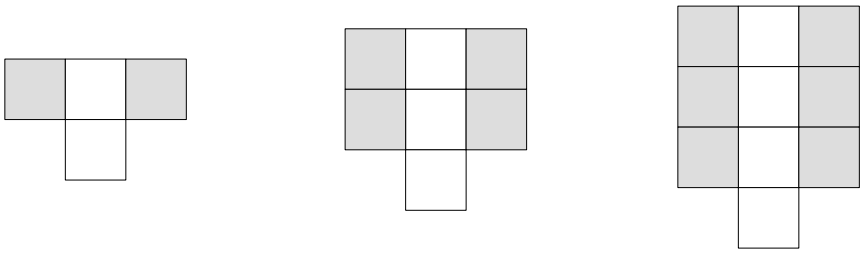
$(10)^2 + 3 = 103$

103

(1)

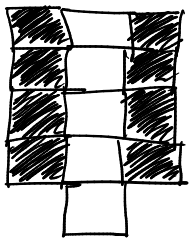
**(Total for Question 10 is 3 marks)**

**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?

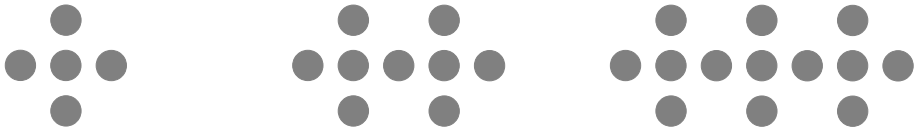
You must give a reason for your answer.

No The number of white tiles goes up by 1 each time. There will be 7 white tiles in pattern 6.

(1)

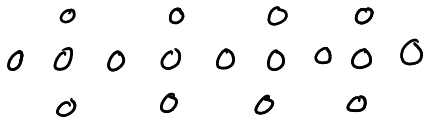
**(Total for Question 11 is 4 marks)**

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



pattern number 1 pattern number 2 pattern number 3

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



(1)

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

4n+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)**

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**13** Here are the first five terms of a sequence.

−4

31 27 23 19 15 11 7 3

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

−4n −4 −8 −12
−4n + 35 31 27 23

−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 $n$th term of this sequence.

$4n$ 4 8 12 16

$4n - 7$

(2)

The $n$th 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 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 $n$th term of this sequence.

$5n$ 5 10 15 20

$5n + 4$

**(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 $n$th term of this sequence.

$-3n$ -3 -6 -9

$-3n + 28$

**(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 $n$th term of the sequence.

$7n$ 7 14 21 28

$7n - 3$

**(Total for Question 17 is 2 marks)**

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**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 $n$th term of the sequence.

$-4n$ $-4$ $-8$ $-12$ $-16$

$-4n + 39$

**(Total for Question 18 is 2 marks)**

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**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 $n$th term of the sequence.

$6n$ 6 12 18 24 30

$6n + 15$

**(Total for Question 19 is 2 marks)**

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**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 $n$th term of the sequence.

$5n$ 5 10 15 20 25

$5n - 3$

**(Total for Question 20 is 2 marks)**