Bishops Online Tutoring

Education Consultancy

Edexcel GCSE Mathematics

SEQUENCES

Materials Required:
- Pen
- HB Pencil
- Ruler (in centimetres and millimetres)
- Protractor
- Compass

Instructions:
- Use a black ink pen to answer all questions
- Fill your name in the section below
- Answer the questions in the spaces provided
- Show your working out for all answers

Information:
- The marks allocated for each question are displayed within brackets – utilise this information to gauge the appropriate amount of time to dedicate to each question
- Questions marked with an asterisk (*) will assess your written communication; be careful of spelling, punctuation and grammar with these questions

Advice:
- Carefully read the question before attempting to answer it
- Be vary of time and try to answer every question
- If you have enough time in the end, go back and check your answers. A good way to check your answers is to retry the question with the hope of getting the same answer as before without looking at your working out from before

NO CALCULATOR ALLOWED

NAME:	

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

6, 11, 16, 21, 26

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

5n + 1

(Total 2 marks)

2. Here are the first five terms of a number sequence.

3, 8, 13, 18, 23, 28, 33

(a) Write down the next **two** terms of the sequence.

28 , 33

(2)

(b) Explain how you found your answer.

The sequence goes up by 5 each time.

(1)

(c) Explain why 387 is **not** a term of the sequence.

The nth term is 5n-2. If 387 is a term in the sequence then the n value should be whole however it is not.

$5n - 2 = 387$

$5n = 389$

$n = \frac{389}{5} = 77.8$

(1)

(Total 4 marks)

3. Here are the first five terms of a number sequence.

126, 122, 118, 114, 110, 106, 102

(a) Write down the next two terms of the number sequence.

106 , 102

(1)

(b) Explain how you found your answer.

The sequence goes down by 4.

(1)

The 20th term of the number sequence is 50

(c) Write down the 21st term of the number sequence.

50 − 4

..... 46 .....

(1)

(Total 3 marks)

4. Here are the first five terms of a number sequence.

3 (+4) 7 (+4) 11 (+4) 15 (+4) 19

(a) Work out the 8th term of the number sequence.

$4n - 1$

$= 4(8) - 1 = 31$

$= 32 - 1$

..... 31 .....

(1)

(b) Write down an expression, in terms of n, for the nth term of the number sequence.

..... $4n - 1$ .....

(2)

(Total 3 marks)

5. The first five terms of an arithmetic sequence are

2 (+7) 9 (+7) 16 23 30

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

$7n - 5$

..... $7n - 5$ .....

(Total 2 marks)

6. The first five terms of an arithmetic sequence are

2 (+5) 7 (+5) 12 17 22

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

..... $5n - 3$ .....

(Total 2 marks)

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

1 3 7 11 15

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

$4n - 5$

(2)

In another arithmetic sequence the nth term is $8n - 16$

John says that there is a number that is in both sequences.

(b) Explain why John is wrong.

All the terms in the first sequence are odd, whereas the new sequence is all even.

(2)

(Total 4 marks)

8. The first four terms of an arithmetic sequence are

21 17 13 9

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

$-4n + 25$

(Total 2 marks)

9. The nth term of a sequence is $2n^2$

(i) Find the 4th term of the sequence.

$2(4)^2 = 2 \times 16 = 32$ 32

(ii) Is the number 400 a term of the sequence?

$2n^2 = 400$, $n^2 = 200$, $n = \sqrt{200}$, $n = 14.14$ NO

Give reasons for your answer.

Because the n value must be whole and n is equal to 14.14 so therefore 400 is not in sequence.

(Total 3 marks)

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

3 9 15 21 27

+6 +6

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

$6n - 3$

(2)

Ben says that 150 is in the sequence.

(b) Is Ben right?

You must explain your answer.

$6n - 3 = 150$

$6n = 153$

$n = 153/6$

$n = 25.5$

The n value must be whole however the value is 25.5, therefore 150 is not in the sequence.

(1)

(Total 3 marks)

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

2 9 16 23 30

+7 +7

(a) Write down the 12th term of this sequence.

$n^{th}\text{ term} = 7n - 5$

$= 7(12) - 5$

$= 84 - 5$

$= 79$

79

(1)

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

$7n - 5$

(2)

(Total 3 marks)

12. The first four terms of an arithmetic sequence are

21 17 13 9

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

$-4(1)+x=21$

$-4+x=21$

$x=25$

$-4n+25$

$-4n+25$

(Total 2 marks)

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

6, 11, 16, 21, 26

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

$5(1)+x=6$

$5+x=6$

$x=1$

$5n+1$

$5n+1$

(Total 2 marks)

14. The first five terms of an arithmetic sequence are

2 9 16 23 30

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

$7(1)+x=2$

$7+x=2$

$x=-5$

$7n-5$

$7n-5$

(Total 2 marks)

15. Here are the first five terms of a number sequence.

3 8 13 18 23

(a) Write down the next **two** terms of the sequence.

28 , 33

(2)

(b) Explain how you found your answer.

Sequence goes up by 5

(1)

(c) Explain why 387 is **not** a term of the sequence.

n^{th} term is $5n-2$.

$5n-2=387$

$5n=389$

$n=\frac{389}{5}$

The n value is not a whole number therefore 387 is not in sequence

(1)

(Total 4 marks)

16. Here are the first five terms of a number sequence.

3 7 11 15 19

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

$4(1)+x=3$

$4+x=3$

$x=-1$

$4n-1$

$4n-1$

(2)

Adeel says that 319 is a term in the number sequence.

(b) Is Adeel correct?

You must justify your answer.

$4n-1=319$

$4n=320$

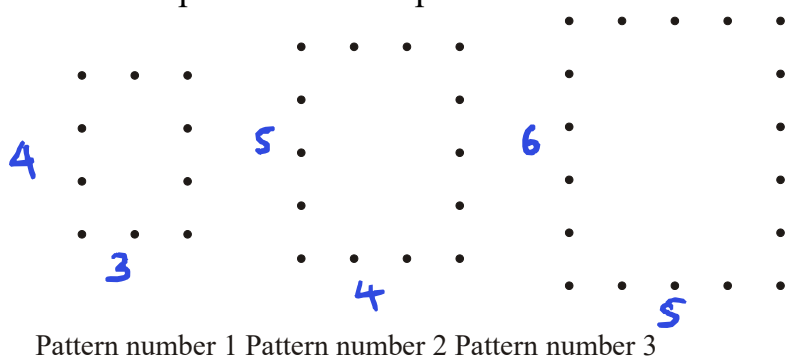
$n=80$

Yes it is because the 80^{th} term is 319.

(2)

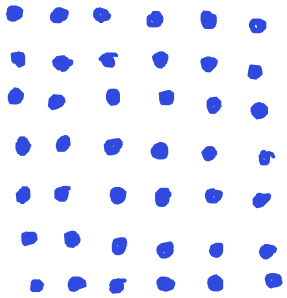
(Total 4 marks)

17. Here are some patterns made up of dots.



Pattern number 1 Pattern number 2 Pattern number 3

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



(1)

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of dots	10	14	18	22	26

+4 +4 +4 +4

(1)

(c) How many dots are used in Pattern number 10?

n^{th} term $= 4n + 6$

So pattern 10

$4(10) + 6$

$= 40 + 6$

$= 46$

46

(1)

(Total 3 marks)