Solutions by
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GCSE (9-1) Grade 4 Sequences (Nth term)

Instructions

Use **black** ink or ball-point pen.
Fill in the boxes at the top of this page with your name.
Answer **all** questions.
Answer the questions in the spaces provided
– there may be more space than you need.
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.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed

Advice

Read each question carefully before you start to answer it
Attempt every question
Check your answers if you have time at the end

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

1 6, 11, 16, 21, 26 (+5 between each pair)

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 (+5 between each pair)

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

28, 33

(2)

(b) Explain how you found your answer.

Added 5

(1)

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

Because numbers in this sequence end in 3 and 8.

(1)

(Total 4 marks)

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

126, 122, 118, 114, 110, 106, 102 (−4 between each pair)

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

106, 102

(1)

(b) Explain how you found your answer.

Subtract 4 each time

(1)

The 20th term of the number sequence is 50

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

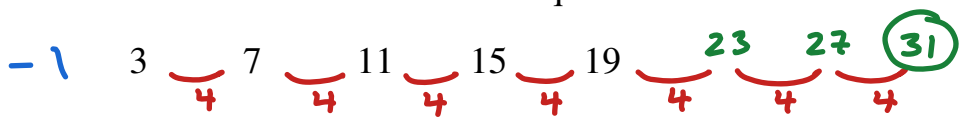
50 - 4 = 46

.....

(1)

(Total 3 marks)

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



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

31

.....

(1)

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

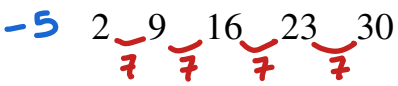
4n - 1

.....

(2)

(Total 3 marks)

5. The first five terms of an arithmetic sequence are



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

7n - 5

.....

(Total 2 marks)

6. The first five terms of an arithmetic sequence are



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.

-5 −1 (+4) 3 (+4) 7 (+4) 11 (+4) 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.

In $8n-16$ all the numbers are even and in $4n-5$ all the numbers are odd So there is no number in both sequences.

(2)

(Total 4 marks)

8. The first four terms of an arithmetic sequence are

25 21 (−4) 17 (−4) 13 (−4) 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.

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

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

$2n^2 = 400$

$n^2 = 200$

$n = \sqrt{200}$

no

Give reasons for your answer.

As the solution to $2n^2 = 400$ isn't an integer.

(Total 3 marks)

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

-3 3 9 15 21 27
(+6 between each)

(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.

No as all the terms of the sequence are odd and 150 is even.

or

$6n - 3 = 150$

$6n = 153$

$n = \frac{153}{6}$

$6\overline{)153.00}$ = 025.5

$n = 25.5$ so no

(1)

(Total 3 marks)

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

-5 2 9 16 23 30
(+7 between each)

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

$7(12) - 5 = 79$

(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

25 21 17 13 9

(−4, −4, −4)

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

$-4n + 25$

.....

(Total 2 marks)

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

1 6, 11, 16, 21, 26

(5, 5, 5, 5)

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

$5n + 1$

.....

(Total 2 marks)

14. The first five terms of an arithmetic sequence are

−5 2 9 16 23 30

(7, 7, 7, 7)

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

$7n - 5$

.....

(Total 2 marks)

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

3 (+5) 8 (+5) 13 (+5) 18 (+5) 23 (+5) 28 (+5) 33

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

28, 33

(2)

(b) Explain how you found your answer.

Added 5 each time

(1)

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

Numbers in this sequence only end in '3' or '8' so 387 is not in the sequence

(1)

(Total 4 marks)

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

-1 3 (+4) 7 (+4) 11 (+4) 15 (+4) 19

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

$4n - 1$

(2)

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

(b) Is Adeel correct?
You must justify your answer.

$4n - 1 = 319$

$4n = 320$

$n = \frac{320}{4}$

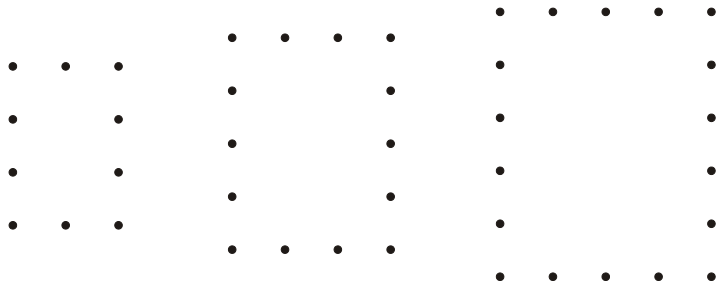
$n = 80$

Yes. It's the 80th term.

(2)

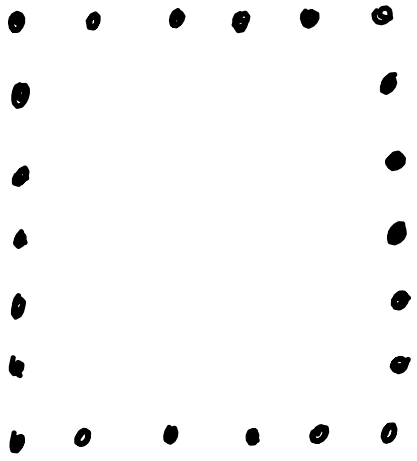
(Total 4 marks)

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?

$4n + 6$

$4 \times 10 + 6 = 46$

(1)

(Total 3 marks)