Name:

Exam Style Questions

Sequences: nth term

Corbettmaths

Equipment needed: Pen and Calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

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Video 288

Answers and Video Solutions

1. Here are the first five terms in a number sequence.

7 10 13 16 19 22 25 28 31 34

(a) Find the 10th term in this number sequence.

34

(2)

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

	7	10	13	16
$3n$	3	6	9	12

$3n+4$

(2)

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2. A number sequence has nth term of $6n + 3$

(a) Write down the first four terms of this sequence.

1st term 9, 2nd term 15, 3rd term 21, 4th term 27

(3)

(b) Sara says that 1008 is a term in this sequence.
Explain why she is wrong.

1008 is even, but all terms in the sequence $6n+3$ will be odd.

(1)

3. A sequence of numbers is shown below.

1 5 9 13 17 ... ...

(a) Find an expression for the nth term of the sequence.

	1	5	9	13
$4n$	4	8	12	16

$4n - 3$

(2)

(b) Explain why 95 will not be a term in this sequence.

$4n - 3 = 95$

$4n = 98$

$n = 24.5$

95 is between the 24th and 25th terms.

(2)

4. The nth term of a number sequence is given by $5n + 2$

(a) Work out the first three terms of the number sequence.

1st term 7, 2nd term 12, 3rd term 17

(2)

Here are the first five terms of another number sequence.

5 11 17 23 29

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

	5	11	17	23
$6n$	6	12	18	24

$6n - 1$

(2)

5. A sequence of numbers is shown.

2 9 16 23 30 ... ...

(a) Find an expression for the nth term of the sequence.

2 9 16 23

7 14 21 28

$7n - 5$

(2)

(b) Find the 100th term in the sequence.

$7 \times 100 - 5$

695

(2)

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6. Here is the linear sequence

10 16 22 28

6n 6 12 18 24

Circle the nth term of the sequence

$4n + 6$ $n + 6$ $6n + 4$ $6n$

(2)

7. The nth term of a number sequence is $n^2 + 3$

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

1st term 4, 2nd term 7, 3rd term 12

(2)

(b) Work out the difference between the 5th and 10th terms in the sequence.

5th term

$5^2 + 3$

$25 + 3 = 28$

10th term

$10^2 + 3 = 103$

$103 - 28 = 75$

75

(3)

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8. The first 5 terms in a number sequence are

$-3n$	10	7	4	1	–2	...	...
	-3	-6	-9	-12			

(a) Work out the nth term of the sequence.

$13 - 3n$

or

$-3n + 13$

(2)

(b) Find the 50th term of the sequence.

$13 - 3 \times 50$

$13 - 150 = -137$

-137

(2)

9. Work out the *n*th term for this sequence

	12	22	32	42	52	...	...
$10n$	10	20	30	40			

$10n+2$

(2)

10. The *n*th term of a sequence is $3n - 2$

(a) Write down the first two terms of this sequence.

1st term 1, 2nd term 4

(2)

(b) Which term of the sequence is equal to 70?

$3n - 2 = 70$

$3n = 72$

$n = 24$

24^{th}

(2)

(c) Explain why 101 is not a term in the sequence.

$3n - 2 = 101$

$3n = 103$

$n = 34.333...$

101 will be between the 34^{th} and 35^{th} terms in the sequence.

(2)

11. Here are the *n*th terms of 4 sequences.

Sequence 1	nth term	3n + 1
Sequence 2	nth term	5n + 10
Sequence 3	nth term	10n
Sequence 4	nth term	5n – 1

For each sequence state whether the numbers in the sequence are

A Always multiples of 5
S Sometimes multiples of 5
N Never multiples of 5

$3n+1$	4	7	10	13	16
$5n+10$	15	20	25	30	35
$10n$	10	20	30	40	50
$5n-1$	4	9	14	19	24

Sequence 1 ..... S .....

Sequence 2 ..... A .....

Sequence 3 ..... A .....

Sequence 4 ..... N .....

(4)

12. The first four terms of an arithmetic sequence are

$$-25 \qquad -37 \qquad -49 \qquad -61$$

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

-25 -37 -49 -61

-12n -12 -24 -36 -48

-12n - 13

(2)

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13. The *n*th term of a sequence is $5 - 3n$

Write down the first three terms of the sequence.

$5 - 3 \times 1$

$5 - 3 = 2$

$5 - 3 \times 2$

$5 - 6 = -1$

$5 - 3 \times 3$

$5 - 9 = -4$

1st term 2, 2nd term -1, 3rd term -4

(2)

14. The nth term of a sequence is $4n - 7$

(a) Write down the first three terms of the sequence.

1st term -3, 2nd term 1, 3rd term 5

(2)

(b) What is the difference between the 150th and 151st terms?

4

4

(1)

The last term of this sequence is 393

(c) How many terms are there in this sequence?

$4n - 7 = 393$

$+7 \quad +7$

$4n = 400$

$n = 100$

100

(2)

15. Find the nth term of the sequences

(a) 1, 4, 9, 16, 25, ...

n^2

(1)

(b) 3, 6, 11, 18, 27, ...

$n^2 + 2$

(1)

(c) –3, 0, 5, 12, 21, ...

$n^2 - 4$

(1)

(d) 2, 8, 18, 32, 50, ...

$2n^2$

(1)

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16. The nth term of a sequence is $9n + 7$

Write down all the numbers from the sequence that are **prime** and **less than 100**.

16 25 34 (43) 52 (61) 70 (79) 88 (97)

43, 61, 79, 97

(2)

17. The first 5 terms in a number sequence are

30 25 20 15 10 ... ...

Work out the nth term of the sequence.

$-5n$ -5 -10 -15 -20

$35 - 5n$

or

$-5n + 35$

.....

(2)

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

9 17 25 33

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

9 17 25 33

$8n$ 8 16 24 32

$8n + 1$

.....

(2)

The nth term of a difference sequence is $20 - 3n$

(b) Is -71 a term in the sequence?
Show your working out.

$20 - 3n = -71$

$20 = -71 + 3n$

$91 = 3n$

$n = 30.333...$

No

.....

(2)

19. The first 5 terms in a number sequence are

	2	2.5	3	3.5	4	...	...
0.5n	0.5	1	1.5	2	2.5		

(a) Work out the *n*th term of the sequence.

$0.5n + 1.5$

(2)

(b) Work out the 20th term of the sequence.

$0.5 \times 20 + 1.5$

$10 + 1.5$

11.5

(2)

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20. The 4th term of a linear sequence is 26
The 6th terms of the same sequence is 32

Work out the nth term of the sequence.

17 20 23 26 29 32

3n	3	6	9	12

$3n + 14$

(3)

21. The first 5 terms of a sequence are

	1	5	9	13	17
4n	4	8	12		

(a) Work out the nth term for this sequence.

4n - 3

(2)

The first 5 terms of a sequence are

$$\frac{1}{12} \quad \frac{5}{23} \quad \frac{9}{34} \quad \frac{13}{45} \quad \frac{17}{56}$$

(a) Work out the nth term for this sequence.

12 23 34 45 ...

1n 12 23 34 45

11n + 1

4n-3 / 11n+1

(2)

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22. Here are the first 4 terms of a sequence

$$\frac{2}{3} \quad \frac{3}{5} \quad \frac{4}{7} \quad \frac{5}{9} \quad \frac{6}{11}$$

(a) Find the next term of the sequence

$\frac{6}{11}$

(1)

(b) Find the nth term of the sequence

2 3 4 5

n 1 2 3 4

n+1

3 5 7 9

2n 2 4 6 8

2n+1

n+1 / 2n+1

(1)

23. Here are the first 4 terms of a sequence

$$\frac{7}{8} \quad \frac{9}{11} \quad \frac{11}{14} \quad \frac{13}{17}$$

Write down the 20th term of the sequence.

7 9 11 13 — 2n: 2 4 6 8 — 2n+5

8 11 14 17 — 3n: 3 6 9 12 — 3n+5

2n+5
3n+5

45

$\frac{9}{13}$

.....

(2)

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24. Martin has written the first 50 terms of the sequence with nth term $150 - 4n$.

Work out which term is the first negative term.

Approach 1

$150 - 4 \times 30 = 30$

$150 - 4 \times 35 = 10$

$150 - 4 \times 37 = 2$

$150 - 4 \times 38 = -2$

Approach 2

$150 - 4n = 0$

$150 = 4n$

$n = 37.5$

38th

.....38th term (-2).....

(3)

25. The first 4 terms of sequence A are

	4	9	14	19
$5n$	5	10	15	

(a) Find the nth term of sequence A.

$5n - 1$

.....

(2)

The nth term of sequence B is $2n + 6$

The nth terms of sequence A and sequence B are added together to give the nth term of sequence C.

Is 1000 is a term in sequence C?

$5n - 1$
$2n + 6$
$7n + 5$

$7n + 5 = 1000$
$7n = 995$
$n = 142.142...$

No

.....

(2)

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26. The nth term of a sequence is $(n + 1)(n + 3)$

Work out the first three terms of the sequence.

1st term $2 \times 4 = 8$

2nd term $3 \times 5 = 15$

3rd term $4 \times 6 = 24$

1st term 8, 2nd term 15, 3rd term 24

(2)