

Sequences

Higher worksheet

- 1) Find the next two terms in this arithmetic sequence:
 $-11, -14, -17, -20, -23, \dots$

- 2) Find the next two terms in this Fibonacci-type sequence:
 $8, -3, 5, 2, 7, \dots$

- 3) Find the next term in this geometric sequence:
 $2, 12, 72, 432, 2592, \dots$

- 4) Find the missing term in this arithmetic sequence:
 $11, 14, \dots, 20, 23,$

- 5) Find the missing term in this geometric sequence:
 $-5, -10, \dots, -40, -80,$

- 6) What type of sequence is this?
 $13, 17, 21, 25, 29, \dots$

- 7) Find the missing term in this quadratic sequence:
 $-1, \dots, 17, 32, 51, 74,$

- 8) What type of sequence is this?
 $8, 19, 40, 71, 112, \dots$

- 9) The n th term of a sequence is $3n + 7$. What is the 20th term of the sequence?

Sequences

Higher worksheet

- 10) The n th term of a sequence is $6n + 2$. Write an expression for the k^{th} term of the sequence.

- 11) The n th term of a sequence is $2n - 5$. List the first four terms of the sequence.

- 12) The n th term of a sequence is $-4n - 3$. List the first four terms of the sequence.

- 13) The n th term of a sequence is $3n^2 + 4n + 16$. What is the seventh term of the sequence?

- 14) Find the n th term of this arithmetic sequence:
9, 12, 15, 18, 21

- 15) Find the n th term of this linear sequence:
1, -3, -7, -11, -15,...

- 16) Find the n th term of this quadratic sequence:
15, 18, 23, 30, 39,...

Sequences

Higher worksheet

- 17) Find the n th term of this quadratic sequence:
8, 5, 6, 11, 20,...
- 18) Find the n th term of this quadratic sequence:
-26, -40, -64, -98, -142,...
- 19) The sixth term of an arithmetic sequence is -25.
The fourteenth term is -49.
Find an expression for the n th term of the sequence.

Sequences

Higher worksheet

- 1) Find the next two terms in this arithmetic sequence:
-11, -14, -17, -20, -23, ...
-26, -29 (each term is 3 less than the term before)
- 2) Find the next two terms in this Fibonacci-type sequence:
8, -3, 5, 2, 7, ...
9, 16 (each term is the sum of the two terms before)
- 3) Find the next term in this geometric sequence:
2, 12, 72, 432, 2592, ...
15,552 (each term is 6 times the term before)
- 4) Find the missing term in this arithmetic sequence:
11, 14, ..., 20, 23,
17 (each term is 3 more than the term before)
- 5) Find the missing term in this geometric sequence:
-5, -10, ..., -40, -80,
-20 (each term is 2 times the term before)
- 6) What type of sequence is this?
13, 17, 21, 25, 29, ...
Arithmetic (the sequence has a common first difference)
- 7) Find the missing term in this quadratic sequence:
-1, ..., 17, 32, 51, 74,
6 (Working backwards from 74, we need to first subtract **23**, then **19**, then **15** to get to 17. To get to the missing number, we therefore need to subtract **11**.)
- 8) What type of sequence is this?
8, 19, 40, 71, 112, ...
Quadratic (the sequence has a constant second difference but not a constant first difference)
- 9) The n th term of a sequence is $3n + 7$. What is the 20th term of the sequence?
 $3 \times 20 + 7 = 67$

Sequences

Higher worksheet

- 10) The n th term of a sequence is $6n + 2$. Write an expression for the k^{th} term of the sequence.
 $6 \times k + 2 = 6k + 2$
- 11) The n th term of a sequence is $2n - 5$. List the first four terms of the sequence.
 $-3, -1, 1, 3$
- 12) The n th term of a sequence is $-4n - 3$. List the first four terms of the sequence.
 $-7, -11, -15, -19$
- 13) The n th term of a sequence is $3n^2 + 4n + 16$. What is the seventh term of the sequence?
 $3 \times 7^2 + 4 \times 7 + 16 = 191$
- 14) Find the n th term of this arithmetic sequence:
 $9, 12, 15, 18, 21$
 $3n + 6$
- 15) Find the n th term of this linear sequence:
 $1, -3, -7, -11, -15, \dots$
 $-4n + 5$
- 16) Find the n th term of this quadratic sequence:
 $15, 18, 23, 30, 39, \dots$
 First differences: $3, 5, 7, 9, \dots$
 Second differences: $2, 2, 2, 2, \dots$
 Therefore, the sequence is of the form $n^2 + bn + c$
- | | | | | | |
|----------------|----|----|----|----|----|
| n^2 | 1 | 4 | 9 | 16 | 25 |
| 14 | 14 | 14 | 14 | 14 | 14 |
| Given sequence | 15 | 18 | 23 | 30 | 39 |

The n th term is $n^2 + 14$

Sequences

Higher worksheet

- 17) Find the n th term of this quadratic sequence:

8, 5, 6, 11, 20,...

First differences: -3, 1, 5, 9,...

Second differences: 4, 4, 4, 4,...

Therefore the sequence is of the form $2n^2 + bn + c$

$2n^2$	2	8	18	32	50
$-9n + 15$	6	-3	-12	-21	-30
Given sequence	8	5	6	11	20

The n th term is $2n^2 - 9n + 15$

- 18) Find the n th term of this quadratic sequence:

-26, -40, -64, -98, -142,...

First differences: -14, -24, -34, -44,...

Second differences: -10, -10, -10, -10,...

Therefore the sequence is of the form $-5n^2 + bn + c$

$-5n^2$	-5	-20	-45	-80	-125
$n - 22$	-21	-20	-19	-18	-17
Given sequence	-26	-40	-64	-98	-142

The n th term is $-5n^2 + n - 22$

- 19) The sixth term of an arithmetic sequence is -25.

The fourteenth term is -49.

Find an expression for the n th term of the sequence.

The fourteenth term is **8** terms further along the sequence than the sixth term. -49 is **24** less than -25.

So the sequence is going *down* in steps of $24 \div 8 = 3$ ie going up in steps of -3.

Therefore the n th term is of the form $-3n + c$, where c is a constant.

When $n = 6$, we know $-3n + c = -25$ i.e. $-18 + c = -25$.

Therefore $c = -7$.

So the n th term is $-3n - 7$.

We can test this by substituting $n = 14$ and making sure the fourteenth term works out to be -49.