

The n th Term of a Quadratic Sequence

ANSWERS

1

Find the n th term of
4, 7, 12, 19, 28

4	7	12	19	28
3	5	7	9	
2	2	2		

halve the second difference

$2 \div 2 = 1$ so it starts $1n^2$

sequence	4	7	12	19	28
the n^2 part	1	4	9	16	25
what is left	3	3	3	3	3

n th term $n^2 + 3$

2

Find the n th term of
3, 9, 19, 33, 51

3	9	19	33	51
6	10	14	18	
4	4	4		

halve the second difference

$4 \div 2 = 2$ so it starts $2n^2$

sequence	3	9	19	33	51
the n^2 part	2	8	18	32	50
what is left	1	1	1	1	1

n th term $2n^2 + 1$

3

Find the n th term of
-1, 2, 7, 14, 23

-1	2	7	14	23
3	5	7	9	
2	2	2		

halve the second difference

$2 \div 2 = 1$ so it starts $1n^2$

sequence	-1	2	7	14	23
the n^2 part	1	4	9	16	25
what is left	-2	-2	-2	-2	-2

n th term $n^2 - 2$

4

Find the n th term of
5, 14, 29, 50, 77

5	14	29	50	77
9	15	21	27	
6	6	6		

halve the second difference

$6 \div 2 = 3$ so it starts $3n^2$

sequence	5	14	29	50	77
the n^2 part	3	12	27	48	75
what is left	2	2	2	2	2

n th term $3n^2 + 2$

5

Find the n th term of
2, 6, 12, 20, 30

2	6	12	20	30
4	6	8	10	
2	2	2		

$2 \div 2 = 1$ so it starts $1n^2$

sequence	2	6	12	20	30
the n^2 part	1	4	9	16	25
what is left	1	2	3	4	5

n th term $n^2 + n$

6

Find the n th term of
4, 9, 16, 25, 36

4	9	16	25	36
5	7	9	11	
2	2	2		

$2 \div 2 = 1$ so it starts $1n^2$

sequence	4	9	16	25	36
the n^2 part	1	4	9	16	25
what is left	3	5	7	9	11

n th term $n^2 + 2n + 1$

7

The n th term of a sequence is $n^2 + 3n$.
Find the 10th term.

$$10^2 + 3 \times 10$$

Answer 130

8

The n th term of a sequence is $n^2 + 2$.
Is 51 in the sequence?
Show how you know.

$$7^2 + 2 = 51$$

Answer Yes, the 7th term

The n th Term of a Quadratic Sequence further practice

ANSWERS

9

Find the n th term of 2, 9, 22, 41, 66

second difference 6, so $3n^2$

Answer $3n^2 - 2n + 1$

10

Find the n th term of 6, 7, 6, 3, -2

second difference -2, so $-n^2$

Answer $-n^2 + 4n + 3$

11

The n th term of a sequence is
 $n^2 + bn + c$. The 1st term is 5 and the
3rd term is 15. Find b and c .

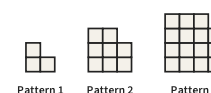
$$1 + b + c = 5 \text{ and } 9 + 3b + c = 15$$

$$\text{subtract: } 8 + 2b = 10$$

Answer $b = 1, c = 3$

12

Each pattern is made of
small squares. How many small
squares are in Pattern 20?



$$3, 8, 15, 24: n\text{th term } n^2 + 2n$$

$$20^2 + 2 \times 20 = 440$$

Answer 440

13

Sequence A has n th term $n^2 + 20$.
Sequence B is 9, 18, 27, 36, ...
For which values of n is the n th term
of A equal to the n th term of B?

$$n^2 + 20 = 9n$$

$$(n - 4)(n - 5) = 0$$

Answer $n = 4$ and $n = 5$

14

The table shows how many diagonals
polygons with 4, 5, 6 and 7 sides have.
The numbers of diagonals make a
quadratic sequence. How many sides
does a polygon with 54
diagonals have?

sides	4	5	6	7
diagonals	2	5	9	14

$$2, 5, 9, 14, 20, 27, 35, 44, 54$$

$$54 \text{ is the 9th term: } 9 + 3 = 12 \text{ sides}$$

Answer 12 sides

15

At the end of each week Ella writes
down the total distance she has run
so far: 5 km, 12 km, 21 km, 32 km and
so on. The totals make a
quadratic sequence. In which week
does her total first go over 200 km?

$$n\text{th term } n^2 + 4n$$

$$\text{week 12: } 192 \text{ km, week 13: } 221 \text{ km}$$

Answer week 13

16

Is 300 a term of the sequence
5, 11, 19, 29, ...? Explain how
you know.

$$n\text{th term } n^2 + 3n + 1$$

$$15\text{th term } 271, 16\text{th term } 305$$

Answer No