QUADRATIC SEQUENCES – PRACTICE QUESTIONS

metatutor

1.
Find the nth term of the sequence 4, 5, 8, 13, ...

4 → 5 → 8 → 13
1 → 3 → 5
2 → 2

seq	4	5	8	13
n^2	1	4	9	16
dif	3	1	-1	-3
	-2	-2	-2	

nth term of dif = $-2n+5$

n^2-2n+5

2.
Find the nth term of the sequence 3, 6, 11, 18, ...

3 → 6 → 11 → 18
3 → 5 → 7
2 → 2

seq	3	6	11	18
n^2	1	4	9	16
dif	2	2	2	2

nth term of dif = 2

n^2+2

3.
Find the nth term of the sequence 2, 7, 14, 23, ...

2 → 7 → 14 → 23
5 → 7 → 9
2 → 2

seq	2	7	14	23
n^2	1	4	9	16
dif	1	3	5	9
	2	2	2	

nth term of dif = $2n-1$

n^2+2n-1

4.
Find the nth term of the sequence 6, 7, 12, 21, ...

6 7 12 21
1 5 9
4 4

$2n^2 - 5n + 9$

seq	6	7	12	21
$2n^2$	2	8	18	32
dif	4	-1	-6	-11
		-5	-5	-5

nth term of dif = $-5n + 9$

5.
Find the nth term of the sequence 1, 5, 13, 25, ...

1 5 13 25
4 8 12
4 4

seq	1	5	13	25
$2n^2$	2	8	18	32
dif	-1	-3	-5	-7
		-2	-2	-2

$-2n + 1$

$2n^2 - 2n + 1$

6.
Find the nth term of the sequence 8, 10, 16, 26, ...

8 10 16 26
2 6 10
4 4

seq	8	10	16	26
$2n^2$	2	8	18	32
dif	6	2	-2	-6
		-4	-4	-4

$-4n + 10$

$2n^2 - 4n + 10$

7.
Find the nth term of the sequence 2, 3, 10, 23, ...

2 3 10 23
1 7 13
6 6

seq	2	3	10	23
$3n^2$	3	12	27	48
dif	-1	-9	-17	-25
		-8	-8	-8

$-8n+7$

$3n^2-8n+7$

8.
Find the nth term of the sequence 5, 8, 17, 32, ...

5 8 17 32
3 9 15
6 6

seq	5	8	17	32
$3n^2$	3	12	27	48
dif	2	-4	-10	-16
		-6	-6	-6

$-6n+8$

$3n^2-6n+8$

9.
Find the nth term of the sequence 4, 9, 16, 25, ...

4 9 16 25
5 7 9
2 2

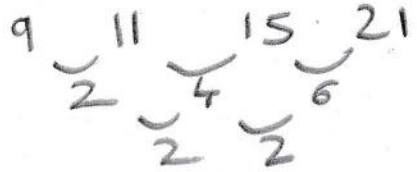
seq	4	9	16	25
n^2	1	4	9	16
dif	3	5	7	9
		2	2	2

$2n+1$

n^2+2n+1

10.
The first four terms of a sequence are 9, 11, 15 and 21.

Find the 25th term in the sequence.



$n^2 - n + 9$

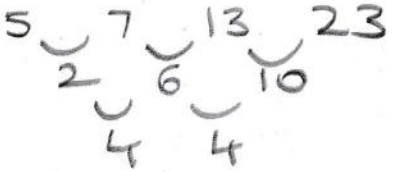
seq	9	11	15	21
n^2	1	4	9	16
dif	8	7	6	5
		-1	-1	-1

$-1n + 9$

$25^2 - 25 + 9 = 609$

11.
The first four terms of a sequence are 5, 7, 13 and 23.

Find the 30th term in the sequence.



$2n^2 - 4n + 7$

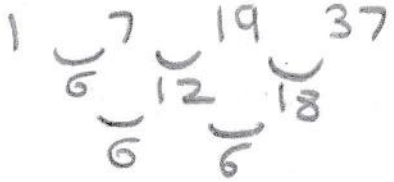
seq	5	7	13	23
$2n^2$	2	8	18	32
dif	3	-1	-5	-9
		-4	-4	-4

$-4n + 7$

$2 \times 30^2 - 4 \times 30 + 7$
$= 1,687$

12.
The first four terms of a sequence are 1, 7, 19 and 37.

Find the 15th term in the sequence.



$3n^2 - 3n + 1$

seq	1	7	19	37
$3n^2$	3	12	27	48
dif	-2	-5	-8	-11
		-3	-3	-3

$-3n + 1$

$3 \times 15^2 - 3 \times 15 + 1 =$
631

13.
The first four terms of a sequence are 2, 9, 18 and 29.

Find the difference between the 10th and 15th terms in the sequence.

2 9 18 29

7 9 11

2 2

seq	2	9	18	29
n^2	1	4	9	16
dif	1	5	9	13
		4	4	4

$4n-3$

n^2+4n-3

$15^2+4\times15-3=282$

$10^2+4\times10-3=137$

$282-137=145$

14.
The first four terms of a sequence are 1, 2, 5 and 10.

Is 65 in the sequence?

1 2 5 10

1 3 5

2 2

seq	1	2	5	10
n^2	1	4	9	16
dif	0	-2	-4	-6
		-2	-2	-2

$-2n+2$

n^2-2n+2

$n^2-2n+2=65$

$n^2-2n-63=0$

$(n-9)(n+7)=0$

$n=9$ or -7

Yes

15.
The first four terms of a sequence are 3, 4, 9 and 18.

Is 123 in the sequence?

3 4 9 18
1 5 9
4 4

seq	3	4	9	18
$2n^2$	2	8	18	32
dif	1	-4	-9	-13
		-5	-5	-5

$2n^2 - 5n + 6$

$2n^2 - 5n + 6 = 123$

$2n^2 - 5n - 117 = 0$

$a = 2, b = -5, c = -117$

$n = \frac{--5 \pm \sqrt{(-5)^2 - 4 \times 2 \times 117}}{2 \times 2}$

$= 9$ or -6.5

Yes

16.
The first four terms of a sequence are -1, 1, 7 and 17.

Is 162 in the sequence?

-1 1 7 17
2 6 10
4 4

seq	-1	1	7	17
$2n^2$	2	8	18	32
dif	-3	-7	-11	-15
		-4	-4	-4

$2n^2 - 4n + 1$

$2n^2 - 4n + 1 = 162$

$2n^2 - 4n - 161 = 0$

$a = 2, b = -4, c = -161$

$n = \frac{--4 \pm \sqrt{(-4)^2 - 4 \times 2 \times -161}}{2 \times 2}$

$= 10.027...$
or
$-8.0277...$

No