Bishops Online Tutoring

Education Consultancy

Edexcel GCSE Mathematics

Quadratic Sequences

Materials Required:

- Pen
- HB Pencil
- Ruler (in centimetres and millimetres)
- Protractor
- Compass

Instructions:

- Use a black ink pen to answer all questions
- Fill your name in the section below
- Answer the questions in the spaces provided
- Show your working out for all answers

Information:

- The marks allocated for each question are displayed within brackets – utilise this information to gauge the appropriate amount of time to dedicate to each question
- Questions marked with an asterisk (*) will assess your written communication; be careful of spelling, punctuation and grammar with these questions

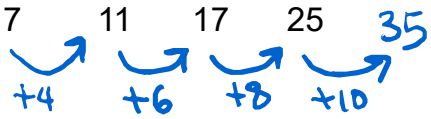
Advice:

- Carefully read the question before attempting to answer it
- Be vary of time and try to answer every question
- If you have enough time in the end, go back and check your answers. A good way to check your answers is to retry the question with the hope of getting the same answer as before without looking at your working out from before

NO CALCULATOR ALLOWED

NAME:	

1. The first four terms of a quadratic sequence are shown below Work out the next term.



35

(2)

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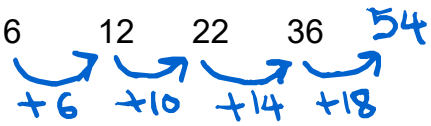
2. The first four terms of a quadratic sequence are shown below Work out the next term.



54

(2)

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3. The n^{th} term of a quadratic sequence is $n^2 - 2n + 8$

Work out the first three terms of this sequence

$n^2 - 2n + 8$

(1) $(1)^2 - 2(1) + 8 = 7$

(2) $(2)^2 - 2(2) + 8 = 8$

(3) $(3)^2 - 2(3) + 8 = 11$

7 8 11

(2)

4. A quadratic sequence has an n^{th} term of $2n^2 + 3n - 1$

Work out the value of the 6^{th} term of the sequence

$2n^2+3n-1$

$= 2(6)^2+3(6)-1$

$= 2(36)+18-1$

$= 89$

89

(2)

5. A sequence has an n^{th} term of $n^2 - 6n + 7$

Work out which term in the sequence has a value of 23.

1 x 16
2 x 8

$n^2-6n+7=23$

$n^2-6n-16=0$

$(n+2)(n-8)=0$

$n=-2, n=8$

8th term

(2)

6. Here are the first 5 terms of a quadratic sequence

4 (+7) 11 (+9) 20 (+11) 31 (+13) 44

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

n^2	1	4	9	16	25
$u_n = n^2$	3	7	11	15	19

4n-1

n^2+4n-1

(3)

7. Here are the first 5 terms of a quadratic sequence

4 (+6) 10 (+8) 18 (+10) 28 (+12) 40

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

n^2	1	4	9	16	25	
$u_n - n^2$	3	6	9	12	15	$3n$

$n^2 + 3n$

(3)

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8. Here are the first 5 terms of a quadratic sequence

9 (+8) 17 (+12) 29 (+16) 45 (+20) 65

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

$2n^2$	2	8	18	32	50	
$u_n - 2n^2$	7	9	11	13	15	$2n + 5$

$2n^2 + 2n + 5$

(3)

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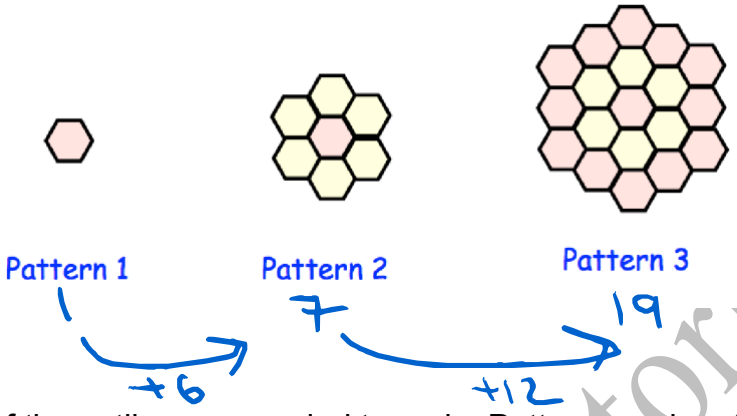
9. Here is a tile.

Here is a sequence of patterns made from these tiles.



How many of these tiles are needed to make Pattern number 10?

$2n^2$ 3 12 27

-2 -5 -8 $-3n+1$

$2n^2-3n+1$

when $n=10$

$= 2(10)^2-3(10)+1$

$= 2(100)-30+1$

$= 200-30+1$

$= 171$

171

(5)

10. The nth term of a sequence is $n^2 + 3n$
Two consecutive terms in the sequence have a difference of

38 Work out the two terms.

$(n+1)^2 + 3(n+1) - (n^2 + 3n) = 38$

$n^2 + 2n + 1 + 3n + 3 - n^2 - 3n = 38$

$2n + 4 = 38$

$2n = 34$

$n = 17$

$17^2 + 3(17) = 340$

$18^2 + 3(18) = 378$

340 and 378

(4)

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11. Prove that every term in the sequence $n^2 - 4n + 21$ is positive

$(n-2)^2 - 4 + 21$

$(n-2)^2 + 17$

$(n-2)^2$ is positive

$(n-2)^2 + 17$ is positive

(4)