

WA7MNALP1

Linear and non-linear patterns and relationships

Core + Challenge

Growing Patterns and Rules — Marking Key

I can describe growing patterns with tables and rules, find unknown terms and tell linear from non-linear.

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

Section A Fluency: 16 Section B Core: 22 Section C Reasoning: 9 Section D Challenge: 9 **Total: 56**

Fluency: 1 mark each; accept an equivalent unsimplified answer for half credit at tutor's discretion.

A

Fluency *answers and working*

/ 16 marks

Q	Answer	Working
1	19	Find the change between terms
2	32	Find the change between terms
3	32	Find the change between terms
4	25	Find the change between terms
5	3	Find the change between terms
6	12.5	Find the change between terms
7	15	Find the change between terms
8	26	Find the change between terms
9	$4n$	Difference gives the multiple of n : $4n$
10	$2n + 3$	Difference gives the multiple of n : $2n + 3$
11	$5n - 2$	Difference gives the multiple of n : $5n - 2$
12	$10n$	Difference gives the multiple of n : $10n$
13	$3n - 2$	Difference gives the multiple of n : $3n - 2$
14	$5n + 1$	Difference gives the multiple of n : $5n + 1$
15	$y = 2x + 5$	Goes up by 2; when $x = 0$, $y = 5$
16	203	$2 \times 100 + 3$

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B

Core *answers, working and marks*

/ 22 marks

Q	Answer	Working / sample response	Marks
1	(a) 16 (b) $3n + 1$ (c) 61	Each new square adds 3 matchsticks <i>1 mark each part</i>	3
2	$2n + 2$; 22	+2 each table; $2 \times 10 + 2$ <i>1 mark: rule</i> <i>1 mark: 22</i>	2
3	$p = 25h$; \$187.50	25×7.5 <i>1 mark: rule</i> <i>1 mark: \$187.50</i>	2
4	(a) No – differences 3, 5, 7 change (b) 100	Square numbers: n^2 <i>1 mark each</i>	2
5	(a) $h = 3w + 12$ (b) 8 weeks	$3w + 12 = 36 \rightarrow 3w = 24$ <i>1 mark: rule</i> <i>1 mark: equation</i> <i>1 mark: 8</i>	3
6	3, 8, 13, 18, 23 – points in a straight line	Constant difference of 5 $\rightarrow$ linear <i>1 mark: table</i> <i>1 mark: straight line</i>	2
7	A: 20; B: $1024 - B$	$A = 2n$; $B = 2^n$ <i>1 mark: both terms</i> <i>1 mark: B</i>	2
8	$2.5k + 4$	Starts at 4, +2.50 per km <i>1 mark: $2.5k$</i> <i>1 mark: + 4</i>	2
9	7; $4n + 3$	$23 - 4 \times 4 = 7$ <i>1 mark: 7</i> <i>1 mark: $4n + 3$</i>	2
10	36	Add 2, 3, 4, 5, ...: 21, 28, 36 <i>1 mark: description</i> <i>1 mark: 36</i>	2

C

Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	Constant difference	If the terms change by the same amount each step, it is linear. <i>2 marks</i>	2
2	$3n + 2$	$n + 3$ gives 4, 5, 6 – it goes up by 1, not 3. <i>1 mark: explanation</i> <i>1 mark: $3n + 2$</i>	2

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Q	Answer	Working / sample response	Marks
3	100 yes ($n = 33$); 150 no	$3n + 1 = 100 \rightarrow n = 33 \checkmark$ $3n + 1 = 150 \rightarrow n = 49.67$, not a whole number <i>1 mark each</i> <i>1 mark: explanation</i>	3
4	3 per new square; 1 starting stick	Each square adds 3 sticks; 1 extra closes the first square. <i>1 mark each</i>	2

D

Challenge *solutions and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	202 (40th term)	Rule $5n + 2$; $5n + 2 > 200 \rightarrow n > 39.6$ <i>1 mark: rule</i> <i>1 mark: 40th, 202</i>	2
2	55	13, 21, 34, 55 <i>2 marks</i>	2
3	$2n + 1$; 49th	$2n + 1 = 99 \rightarrow n = 49$ <i>1 mark: rule</i> <i>1 mark: equation</i> <i>1 mark: 49</i>	3
4	$n = 5$; term 21	$4n + 1 = 6n - 9 \rightarrow 10 = 2n$ <i>1 mark: $n = 5$</i> <i>1 mark: 21</i>	2