
GCSE Mathematics

Quadratic & Geometric Sequences

Mark Scheme - Higher | Grades 6-9

M = method mark, A = accuracy mark (dependent on the preceding M mark), B = independent mark.

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Edexcel-style questions

Q1 Grade 6 Edexcel style

Total: 2

Part	Mark scheme	Marks
(a)	1st term = $1^2 + 3 = 4$	B1
(a)	4th term = $4^2 + 3 = 19$	B1

Q2 Grade 7 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	common ratio = $6 \div 2$	M1
(a)	common ratio = 3	A1
(a)	next term = $54 \times 3 = 162$	A1

Q3 Grade 8 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	1st differences: 5, 7, 9, 11; 2nd difference = 2, so the n^2 coefficient is 1	M1
(a)	n^2 gives 1, 4, 9, 16, 25; sequence - n^2 gives 2, 4, 6, 8, 10, which is $2n$	M1
(a)	nth term = $n^2 + 2n$	A1

Q4 Grade 8 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	$a = 4, r = 3$	M1
(a)	nth term = $4 \times 3^{n-1}$	M1
(a)	6th term = $4 \times 3^5 = 972$	A1

Q5 Grade 9 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	$n^2 + 2n - 1 = 79$	M1
(a)	$n^2 + 2n - 80 = 0$	M1
(a)	$(n + 10)(n - 8) = 0$	M1
(a)	$n = 8$ ($n = -10$ is rejected since n must be a positive integer)	A1

AQA-style questions

Q6 Grade 6 AQA style**Total: 2**

Part	Mark scheme	Marks
(a)	2nd term = $2^2 - 2(2) = 0$	B1
(a)	5th term = $5^2 - 2(5) = 15$	B1

Q7 Grade 7 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	common ratio = $40 \div 80$	M1
(a)	common ratio = 0.5	A1
(a)	next term = $10 \times 0.5 = 5$	A1

Q8 Grade 8 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	1st differences: 3, 5, 7, 9; 2nd difference = 2, so the n^2 coefficient is 1	M1
(a)	n^2 gives 1, 4, 9, 16, 25; sequence - n^2 gives 4, 4, 4, 4, 4, a constant	M1
(a)	nth term = $n^2 + 4$	A1

Q9 Grade 8 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	$a = 6, r = 2$	M1
(a)	nth term = $6 \times 2^{n-1}$	M1
(a)	7th term = $6 \times 2^6 = 384$	A1

Q10 Grade 9 AQA style**Total: 3**

Part	Mark scheme	Marks
(a)	$n^2 + 5n = 200 \Rightarrow n^2 + 5n - 200 = 0$	M1
(a)	discriminant = $5^2 - 4(1)(-200) = 825$	M1
(a)	825 is not a perfect square, so n is not an integer, so 200 is not a term	A1

OCR-style questions

Q11 Grade 6 OCR style

Total: 2

Part	Mark scheme	Marks
(a)	3rd term = $2(3^2) + 1 = 19$	B1
(a)	4th term = $2(4^2) + 1 = 33$	B1

Q12 Grade 7 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	common ratio = $-6 \div 3$	M1
(a)	common ratio = -2	A1
(a)	next term = $-24 \times -2 = 48$	A1

Q13 Grade 8 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	1st differences: 7, 11, 15, 19; 2nd difference = 4, so the n^2 coefficient is 2	M1
(a)	$2n^2$ gives 2, 8, 18, 32, 50; sequence - $2n^2$ gives 2, 3, 4, 5, 6, which is $n + 1$	M1
(a)	nth term = $2n^2 + n + 1$	A1

Q14 Grade 8 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	$a = 100, r = 0.5$	M1
(a)	nth term = $100 \times 0.5^{n-1}$	M1
(a)	5th term = $100 \times 0.5^4 = 6.25$	A1

Q15 Grade 9 OCR style

Total: 4

Part	Mark scheme	Marks
(a)	5th term $\div$ 2nd term = $r^3 = 162 \div 6 = 27$	M1
(a)	$r = 3$	M1
(a)	2nd term = $a \times r = 6 \Rightarrow a \times 3 = 6$	M1
(a)	$a = 2, r = 3$	A1

Teachably-style questions

Q16 Grade 6 Teachably style

Total: 2

Part	Mark scheme	Marks
(a)	4th term = $4^2 + 4 = 20$	B1
(a)	6th term = $6^2 + 6 = 42$	B1

Q17 Grade 7 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	common ratio = $15 \div 5$	M1
(a)	common ratio = 3	A1
(a)	next term = $135 \times 3 = 405$	A1

Q18 Grade 8 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	1st differences: 5, 9, 13, 17; 2nd difference = 4, so the n^2 coefficient is 2	M1
(a)	$2n^2$ gives 2, 8, 18, 32, 50; sequence - $2n^2$ gives -1, -2, -3, -4, -5, which is -n	M1
(a)	nth term = $2n^2 - n$	A1

Q19 Grade 8 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	$a = 2, r = -3$	M1
(a)	nth term = $2 \times (-3)^{n-1}$	M1
(a)	6th term = $2 \times (-3)^5 = -486$	A1

Q20 Grade 9 Teachably style

Total: 3

Part	Mark scheme	Marks
(a)	differences are 4, 12, 36, ... which are not constant, so it is not arithmetic	M1
(a)	ratios are $6 \div 2 = 3, 18 \div 6 = 3, 54 \div 18 = 3$, which are constant	M1
(a)	it is a geometric sequence with common ratio 3	A1

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