Mark scheme

Sequences and nth term

Mathematics 0580 · Questions from Paper 1, Paper 2, Paper 3 and Pape…

Total marks

66

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
2	2	3	5	5	6	9	12	11	11	**66**

Question 1 [2]

1	$4n - 5$ oe	**2**	**M1** for $4n + k$ or for $jn - 5$ ($j \neq 0$)

Question 2 [2]

2(a)	31	**1**	
2(b)	32	**1**	

Question 3 [3]

3(a)	$\frac{1}{2n}$ oe final answer	**1**	
3(b)	5^{n-1} oe final answer	**2**	**M1** for recognition of terms being powers of 5

Question 4 [5]

4(a)	8 14 6	**3**	**B1** for each correctly assigned or **M1** for $\frac{20-2}{3}$ oe
4(b)	$11-2n$ oe final answer	**2**	**B1** for answer $j-2n$ or $11-kn$, $k \neq 0$ or $11-2n$ seen then spoilt

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Question 5 **[5]**

5(a)	11	**1**	
5(b)	$4n - 10$ oe final answer and $2n^3 + 1$ oe final answer	**4**	**B2** for $4n - 10$ oe final answer or **B1** for $4n + j$ or $kn - 10$ ($k \neq 0$) or $4n - 10$ seen then spoilt **B2** for $2n^3 + 1$ oe final answer or **B1** for any cubic expression in n or 3rd difference = 12 or for correct answer seen then spoilt

Question 6 **[6]**

6(a)	1000 or 10^3	**1**	
6(b)	$n^2 + 4$ final answer oe	**2**	**B1** for second difference = 2 or for answer as a quadratic expression or for a correct expression shown in the working and then spoilt
6(c)(i)	9	**1**	
6(c)(ii)	12	**2**	**B1** for 21

Question 7 **[9]**

7(a)(i)	-5	**1**	
7(a)(ii)	Subtract 4 oe	**1**	
7(a)(iii)	$15 - 4n$ oe final answer	**2**	**B1** for $k - 4n$ or $15 - jn$ $j \neq 0$
7(b)(i)	$\frac{1}{21}$ or equivalent fraction	**2**	**B1** for $\frac{12}{7}$ and $\frac{10}{6}$
7(b)(ii)	$n = \frac{3}{5}$ oe or $2n \geqslant n + 1$ but $3 < 4$.	**M2**	**M1** for $\frac{3}{4} = \frac{2n}{n+1}$ oe or **M1** for $2n > n + 1$ but $3 < 4$
	No, n is not an integer oe or No, $\frac{3}{4}$ is less than 1, oe	**A1**	

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Question 8 [12]

8	**(a)**	10 12 20 14 18 34	**5**	**B4** for 5 correct **B3** for 4 correct **B2** for 3 correct **B1** for 2 correct
	(b) (i)	$2n + 4$ oe final answer	**2**	**B1** for $2n + k$ or $jn + 4$ $j \neq 0$
	(ii)	$4n + 2$ oe final answer	**2**	**B1** for $4n + k$ or $jn + 2$ $j \neq 0$
	(c)	B [by] 15 [tables]	**3**	**M1FT** for *their* $(2n + 4) = 66$ or *their* $(4n + 2) = 66$ and **A1FT** for $n = 31$ or $n = 16$

Question 9 [11]

9	**(a)** 21 and 34	1	
	(b) –5 8	1 + 1	
	(c) (i) 4, 6	3	**M1** for $2 + d = e$ oe or $d + e = 10$ oe seen and either **M1** for a correct eqn in d or e seen e.g. $2e = 12$ oe or $2d = 8$ oe or **B1** for either correct
	(ii) $x = 28$ $y = –5$ $z = 23$	5	**B4** for any two correct or **M3** for **any** of $18 = 3x – 66$ oe or $3y + 33 = 18$ oe or $33 – 3z = -36$ oe or **M1** for **2** of $y = x – 33$ oe or $y + z = 18$ oe or $x + y = z$ oe and **M1** for combining two of the previous equations correctly isw (does not have to be simplified) after 0 scored **SC1** for –33 + their x = their y or their x + their y = their z or their y + their $z = 18$

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Question 10 **[11]**

10(a)	A 9	**B1**	
	$4n - 11$ oe final answer	**B2**	**B1** for $4n - k$ or $jn - 11$ oe $j \neq 0$
	B 55	**B1**	
	$2n^2 + 5$ oe final answer	**B2**	**B1** for any quadratic or second differences = 4
	C $\frac{6}{2187}$ oe	**B1**	
	$\frac{n+1}{3^{n+2}}$ oe final answer	**B3**	**B2** for 3^{n+2} oe OR **B1** for 3^{n+k} seen oe **B1** for $n + 1$ as the numerator of a fraction
10(b)	331 cao	**1**	

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