Question Number	Scheme	Marks
1.(a)	(i) $a_2 = 1$	B1
	(ii) $a_{107} = 3$	B1 **(2)**
(b)	$\sum_{n=1}^{200}(2a_n - 1) = 5+1+5+1+.....5+1 = 100\times(5+1)$	M1
	$= 600$	A1 **(2)**
		(4 marks)

Question Number	Scheme	Marks
	$f(x) = (3x^2 - 4x - 5)(x-k) - 5$	
3 (a)	States -5	B1 **(1)**
(b)	Sets $f(-2) = 25 \rightarrow (3\times4 - 4\times-2 - 5)(-2-k) - 5 = 25$	M1
	$15(-2-k) = 30 \Rightarrow -2-k = 2 \Rightarrow k = -4$ *	A1* **(2)**
(c)	$(3x^2 - 4x - 5)(x+4) - 5 = 3x^3 + 8x^2 - 21x - 25$	B1
	Attempts $3x-1\overline{)3x^3+8x^2-21x-25}$ to achieve quotient of $...x^2 + ...x + ...$	M1
	and a remainder that is a constant	
	Quotient = $x^2 + 3x - 6$ OR Remainder = -31	A1ft
	Quotient = $x^2 + 3x - 6$ AND Remainder = -31	A1 **(4)**
		(7 marks)

Question Number	Scheme	Marks
1 (a)	$78 + 17\times-3 = 27$	M1, A1 **(2)**
(b)	$\frac{100}{2}(2\times78 + 99\times-3)$	M1
	$= -7050$	A1 **(2)**
		(4 marks)

Question Number	Scheme	Marks
3(a)	$\left(2+\frac{kx}{8}\right)^7 = 2^7 + \binom{7}{1}2^6\left(\frac{kx}{8}\right) + \binom{7}{2}2^5\left(\frac{kx}{8}\right)^2 + \binom{7}{3}2^4\left(\frac{kx}{8}\right)^3 + \ldots$	M1
	$= 128 + 56kx + \frac{21}{2}k^2x^2 + \frac{35}{32}k^3x^3 + \ldots$	B1A1A1
		(4)
(b)	$\frac{35}{32}k^3 - \frac{21}{2}k^2 = \frac{21}{2}k^2 - 56k$	M1
	$5k^2 - 96k + 256 = 0 \Rightarrow k = \ldots$	dM1
	$k = 16, \frac{16}{5}$	A1
		(3)
		Total 7

Question Number	Scheme	Marks
6(a)	Sets $f\left(-\frac{3}{2}\right) = 0 \Rightarrow (9p + 4q = 102)$	M1
	Sets $f(-2) = -5 \Rightarrow (4p + q = 43)$	M1
	Solves to get values for p and q	dM1
	(i) $p = 10$ * (ii) $q = 3$ following two correct equations	A1*, A1
		(5)
(b)	$f'(x) = 12x^2 + 20x + 8$	B1
	Solves $f'(x) = 0 \Rightarrow 4(3x+2)(x+1) = 0 \Rightarrow x = -\frac{2}{3}, -1$	M1, A1
	$-1 < x < -\frac{2}{3}$	A1
		(4)
		Total 9

Question Number	Scheme	Marks
2	$(1+px)^{10} = 1 + 10px + \frac{10\times9}{2}p^2x^2 + \frac{10\times9\times8}{6}p^3x^3 + \ldots$	
	Sets $10p = 15 \Rightarrow p = 1.5$ o.e.	M1 A1
	Finds the value of $45p^2 \Rightarrow q = 101.25$ o.e.	M1 A1
	Finds the value of $120p^3 \Rightarrow r = 405$	M1 A1
		(6) **(6 marks)**

Question Number	Scheme	Marks
4(i)	E.g. $2=\log_3 9$ Eg $\log_3(4x)-\log_3(5x+7)=\log_3\dfrac{4x}{5x+7}$	M1
	E.g. $36x=5x+7$ $\dfrac{4x}{5x+7}=\dfrac{1}{9}$	A1
	$x=\dfrac{7}{31}$	A1
		(3)
(ii)	$\left(\sum_{r=1}^{2}\log_a y^r=\right)\log_a y+\log_a y^2$ or $\left(\sum_{r=1}^{2}(\log_a y)^r=\right)\log_a y+(\log_a y)^2$	B1
	$\log_a y+\log_a y^2=\log_a y+(\log_a y)^2\Rightarrow 2\log_a y-(\log_a y)^2=0$ $\Rightarrow \log_a y(2-\log_a y)=0\Rightarrow \log_a y=2$	M1
	$y=a^2$	A1
		(3)
		Total 6