Question	Scheme	Marks	AOs
11(a)	$A = 3^7 = 2187$	B1	1.1b
		(1)	
(b)	${}^7C_1 \times 3^6 \times \frac{k}{9}$ or ${}^7C_2 \times 3^5 \times \left(\frac{k}{9}\right)^2 = 406$	M1	1.1b
	${}^7C_1 \times 3^6 \times \frac{k}{9} + {}^7C_2 \times 3^5 \times \left(\frac{k}{9}\right)^2 = 406 \Rightarrow ...k^2 \pm ...k \pm ... = 406$	dM1	1.1b
	$\Rightarrow 9k^2 + 81k - 58 = 0$ *	A1*	1.1b
		(3)	
(c)(i)	$k = \frac{2}{3}$	B1	1.1b
(ii)	$"63" \times \left(\frac{2}{3}\right)^2 = 28$	M1 A1	1.1b 1.1b
		(3)	
(d)	$2 \times "2187" + 2 \times "28" x^2$	M1	3.1a
	$= 4374 + 56x^2$	A1	1.1b
		(2)	
			(9 marks)

Notes

(a)

B1: 3^7 or 2187

(b)

M1: Attempts to find either the coefficient of x **or** the coefficient of x^2. Condone invisible brackets. May be seen in the equation $B + C = 406$

dM1: Substitutes their coefficients for x **and** x^2 into the equation $B + C = 406$ and proceeds to a three-term quadratic in k which is not the given answer. Terms do not need to be on the same side. It is dependent on the previous method mark.

A1*: Achieves the given answer with at least one intermediate stage of working seen between their equation for $B + C = 406$ and proceeds to the answer.

e.g. ${}^7C_1 \times 3^6 \times \frac{k}{9} + {}^7C_2 \times 3^5 \times \left(\frac{k}{9}\right)^2 = 406 \Rightarrow 567k + 63k^2 = 406 \Rightarrow 9k^2 + 81k - 58 = 0$

(c)

(i)

B1: $k = \frac{2}{3}$ only (must reject the negative root if found)

(ii)

M1: Substitutes their positive value for k into their expression for C in terms of k from part (ii) and proceeds to find a value

A1: 28

(d)

M1: Attempts $2 \times A + 2 \times C$ using their A and their C

A1: $4374 + 56x^2$ cao (provided both previous marks have been scored)