Question Number	Scheme	Marks
1(a)	$(u_2 =)\ k-\frac{8}{1}$ and $(u_3 =)\ k-\frac{8}{k-8}\quad\left(=\frac{k^2-8k-8}{k-8}\right)$ oe	M1A1 **(2)**
(b)	$u_3 = 6 \Rightarrow k-\frac{8}{k-8}=6 \Rightarrow k^2-14k+40=0$ $(k-4)(k-10)=0 \Rightarrow k=...$ or $(k=)\ \frac{14\pm\sqrt{14^2-4\times1\times40}}{2\times1}$ $(k=)\ 4,\ 10$	M1 dM1 A1 **(3)**
		(5 marks)

Mark (a) and (b) together

(a)

M1: Uses the given relation correctly **at least once** so score for sight of $k-\frac{8}{1}$ o.e. or condone a correct follow through expression for u_3 from an incorrect u_2

The expression does not need to be simplified.

A1: Both expressions correct which may be unsimplified or equivalent e.g. $k-\frac{8}{1}$ and $k-\frac{8}{k-\frac{8}{1}}$ scores

M1A1. Isw. Condone slips in the notation used for these terms or may not be seen at all.

(b)

M1: Sets their third term equal to 6 and proceeds to a 3TQ in *k*. You do not need to be concerned by the mechanics of the rearrangement

dM1:Solves their 3TQ in *k* via factorisation, the formula or completing the square (usual rules apply).

They are not allowed to just state the roots (dM0A0) and if solved by factorisation then the factorised version of the quadratic must match the quadratic on the previous line.

Dependent on the previous method mark.

A1: Correct values and no others

Question Number	Scheme	Marks
2.	$\left(2-\frac{x}{2}\right)^6 = 2^6 + \binom{6}{1}2^5.\left(-\frac{x}{2}\right) + \binom{6}{2}2^4.\left(-\frac{x}{2}\right)^2 + \ldots$ $= 64 - 96x + 60x^2 + \ldots$	M1 B1A1A1 **(4)**
		(4 marks)

Note that a correct expression scores 4/4

M1: An attempt at the binomial expansion to get the second and/or third term – needs the **correct** binomial coefficient combined with the correct power of x.

Accept any notation for ${}^6C_1$ and ${}^6C_2$, e.g. $\binom{6}{1}$ and $\binom{6}{2}$ (unsimplified) or 6 and 15 from Pascal's triangle. May be implied by either term correct (which may be unsimplified).

Alternatively $\left(2-\frac{x}{2}\right)^6 = 2^6\left(1-\frac{x}{4}\right)^6 \Rightarrow 2^6 \times 6\left(-\frac{x}{4}\right)$ or $2^6 \times \frac{6\times 5}{2!}\left(-\frac{x}{4}\right)^2$

(You only need to look for the correct binomial coefficient combined with the correct power of x.)

In either approach condone bracket errors/invisible brackets for this mark.

B1: 64 (writing just 2^6 is B0).

A1: One of $-96x$ or $60x^2$ Condone $-96x^1$ Must be simplified.

A1: $-96x$ and $60x^2$ (can follow omission of negative sign in working). Condone $+-96x$ if it was part of an expression (not just an isolated term in a list). Must be simplified.

Note: Terms do not need to be written as a polynomial expression. They may appear as a list or appear on different lines. isw once the correct simplified terms have been found unless they divide all terms by e.g. 4