

Question			Answer	Marks	AO	Guidance	
4	(a)		$u_2 = \frac{1}{2}$ $u_3 = -1, u_4 = 2$	B1 B1FT [2]	1.1 1.1	Or 0.5 FT their u_2	Must be seen as $\frac{1}{2}$ and not just $1 - \frac{1}{2}$ Both as simplified numerical values
4	(b)		Periodic, with period 3	B1 [1]	1.2	Any correct description, such as repeating Condone just ‘periodic’ without the period being stated	ISW an incorrect period eg ‘periodic with period 4’ B0 if additional incorrect description eg ‘periodic AP’ Allow recurring, repetitive, cyclic etc Condone looping, circling etc Do not allow harmonic or alternating, even if with another correct description B0 for divergent or oscillating, unless additional detail eg between 3 values Must have a periodic sequence in (a) (with period of at least 3) to gain credit for description See appendix for further examples
4	(c)		$u_1 + u_2 + u_3 = 2 + 0.5 - 1 = 1.5$ so total goes up by 1.5 each time so i $73 = 70.5 + 2 + 0.5$ $= (47 \times 1.5) + 2 + 0.5$ $k = 143$	M1 M1 A1 [3]	3.1a 1.1 1.1	Identify that every block of three terms will increase the total by 1.5 (allow use of $2 + 0.5 - 1$ instead) Attempt to identify the number of terms needed eg 47 blocks plus 2 more terms Obtain $k = 143$	Can still award M1 if using the sum of three of their consecutive terms Must have a periodic sequence in (a) to gain any credit for method (but condone one with a period other than 3) 73 ÷ 1.5 is sufficient for M1 M1 Allow M1 if using blocks of 1.5 to try to find a sum of 73 eg $48 \times 1.5 = 72$ Can still get M1 if attempting to use the sum of their three terms

Exemplar responses for Q4(b)

Response	Mark	Comment
Periodic with order 4	B1 isw	Ignore any attempt to give the period of the sequence as it is just the ‘general behaviour’ that is required.
Repeating, or repetitive or recurring	B1	These are all acceptable descriptions.
Cyclic, or circling or looping	B1	These are all acceptable descriptions.
Repetitive and infinite	B1	The infinite isn’t incorrect, so can be ignored.
Oscillating sequence	B0	MS states B0 for oscillating on its own.
Periodic oscillating	B1 isw	Ignore the comment oscillating if with an acceptable description.
Divergent	B0	Insufficient description on its own.
Repeating and divergent	B1 isw	The divergent isn’t incorrect, so can be ignored.
Repeating and convergent	B0	An incorrect description, alongside an acceptable statement cannot be condoned.
Harmonic	B0	Incorrect description.
Periodic harmonic sequence	B0	An incorrect description, alongside an acceptable statement cannot be condoned.