Question	Scheme	Marks	AOs
2(a)	$r(r-1)^2 = r^3 - 2r^2 + r$	B1	1.1b
	$\sum_{r=1}^{n} r(r-1)^2 = \frac{n^2}{4}(n+1)^2 - 2 \times \frac{n}{6}(n+1)(2n+1) + \frac{n}{2}(n+1)$	M1 A1	2.1 1.1b
	$= \frac{n}{12}(n+1)[3n(n+1) - 4(2n+1) + 6]$	dM1	1.1b
	$= \frac{n}{12}(n+1)\ [3n^2 - 5n + 2]$ $= \frac{n}{12}(n+1)(3n-2)(n-1)$	A1	1.1b
		(5)	
(b)	$\frac{n}{12}(n+1)(n-1)(3n-2) = 5 \times \frac{n}{2}(n+1)$	M1	1.1b
	$3n^3 - 5n^2 - 28n = 0$ or $3n^2 - 5n - 28 = 0$	A1	1.1b
	$(3n+7)(n-4) = 0 \Rightarrow n = \ldots$	M1	1.1b
	$n = 4$ (only)	A1	2.3
		(4)	
			(9 marks)

Notes

(a)

Do not allow proof by induction (but the **B1** could score for $r(r-1)^2 = r^3 - 2r^2 + r$ if seen in an attempt)

B1: Correct expansion.
M1: **Substitutes** at least one of the standard formulae into their expanded expression.
A1: Fully correct expression (simplified or unsimplified).
dM1: Attempts to factorise $\frac{1}{12}n(n+1)$ having used at least one standard formula correctly.
Dependent on the first M mark and dependent on there being $n(n+1)$ in all terms.

A1: Obtains the printed result with no errors seen (brackets may be written in any order).

(b)

M1: Uses their result from part (a) and sets equal to $5 \times \frac{n}{2}(n+1)$ and attempts to expand and collect terms.
A1: Correct cubic or quadratic.
M1: Attempts to solve their 3TQ or cubic equation.
A1: Identifies the correct value of n with no other values offered.