Question Number	Scheme	Marks
1		
(a)	$2n+1=A(n+1)^2+Bn^2 \Rightarrow 2n+1=An^2+2An+1+Bn^2$	
	$A=1\ \ B=-1$ or $\dfrac{1}{n^2}-\dfrac{1}{(n+1)^2}$	B1 (1)
(b)	$\displaystyle\sum_{r=5}^{n}\frac{2r+1}{r^2(r+1)^2}=\sum_{r=5}^{n}\left(\frac{1}{r^2}-\frac{1}{(r+1)^2}\right)$ $=\left(\frac{1}{5^2}-\cancel{\frac{1}{6^2}}\right)+\left(\cancel{\frac{1}{6^2}}-\cancel{\frac{1}{7^2}}\right)+\ldots\left(\cancel{\frac{1}{n^2}}-\frac{1}{(n+1)^2}\right)$	M1
	$\displaystyle\sum_{r=5}^{n}\frac{2r+1}{r^2(r+1)^2}=\frac{1}{5^2}-\frac{1}{(n+1)^2}$	A1
	$=\dfrac{n^2+2n+1-25}{25(n+1)^2}=\dfrac{n^2+2n-24}{25(n+1)^2}$	M1A1 (4)
		[5]
	Notes	
(a) **B1**	Both values correct with or without working seen, may be in the expression. Ignore incorrect working.	
(b) **M1**	Show sufficient terms to demonstrate the cancelling. Require at least one cancelling term seen. Must start at $r = 5$ - M0 if starting at e.g $r = 1$ unless there is a full process to complete the difference method (same condition) **and** apply f(n) −f(4)	
A1	Extract the two correct terms, or in the Alt obtains a correct overall expression.	
M1	Write the terms with a (non-zero) common denominator with at least numerator correct for their terms. Not dependent - may be scored following M0 if no cancelling terms were shown, but must have had exactly two terms to combine from differences.	
A1	Correct answer in the required form or accept correct values stated following an unsimplified form. (Allow as long as correct terms were extracted, even if no cancelling terms were shown.) Note: this means M0A0M1A1 can be scored for answers which show only the last two lines of the scheme with no cancelling process shown. Note: if e.g. r is used in place of n allow full marks if recovered, but A0 if left in terms of r.	
Alt (b) for first two marks	$\displaystyle\sum_{r=1}^{n}\frac{2r+1}{r^2(r+1)^2}=\sum_{r=1}^{n}\left(\frac{1}{r^2}-\frac{1}{(r+1)^2}\right)$ $=\left(\frac{1}{1^2}-\cancel{\frac{1}{2^2}}\right)+\left(\cancel{\frac{1}{2^2}}-\cancel{\frac{1}{3^2}}\right)+\ldots\left(\cancel{\frac{1}{n^2}}-\frac{1}{(n+1)^2}\right)=1-\frac{1}{(n+1)^2}$ $\rightarrow\displaystyle\sum_{r=5}^{n}\frac{2r+1}{r^2(r+1)^2}=1-\frac{1}{(n+1)^2}-\left(1-\frac{1}{25}\right)\left(=\frac{n^2+2n}{(n+1)^2}-\frac{24}{25}\right)$	M1A1