Question Number	Scheme	Marks
1		
1(a)	$\dfrac{2}{r(r+1)(r-1)} = \dfrac{1}{r-1} - \dfrac{2}{r} + \dfrac{1}{r+1}$	M1A1A1 (3)
1(b)	$r=2 \quad 1-\dfrac{2}{2}+\dfrac{1}{3}$	
	$r=3 \quad \dfrac{1}{2}-\dfrac{2}{3}+\dfrac{1}{4}$	
	$r=4 \quad \dfrac{1}{3}-\dfrac{2}{4}+\dfrac{1}{5}$	M1
	$r=n-1 \quad \dfrac{1}{n-2}-\dfrac{2}{n-1}+\dfrac{1}{n}$	
	$r=n \quad \dfrac{1}{n-1}-\dfrac{2}{n}+\dfrac{1}{n+1}$	M1
	$\displaystyle\sum_{r=2}^{n}\left(\frac{1}{r-1}-\frac{2}{r}+\frac{1}{r+1}\right)=\left(1-\frac{2}{2}+\frac{1}{2}+\frac{1}{n}-\frac{2}{n}+\frac{1}{n+1}\right)$	A1
	$\dfrac{1}{2}\displaystyle\sum_{r=1}^{n}\frac{2}{r(r+1)(r-1)}=\frac{1}{2}\times\left(\frac{1}{2}-\frac{1}{n}+\frac{1}{n+1}\right)=\frac{n^2+n-2}{4n(n+1)}$	dM1A1 (5)
		[8]

(a)	
M1	Attempt PFs by any valid method (by implication if 3 correct fractions seen)
A1A1	A1 any 2 fractions correct; A1 third fraction correct
(b)	
	Method of differences with at least 3 terms at start and 2 at end OR 2 at start and 3 at end.
M1	Must start at 2 and end at n One M mark for the initial terms and a second for the final.
M1	Last lines may be missing $k/(n-1)$ and $c/(n-2)$ These 2 M marks may be implied by a correct extraction of terms. If starting from 1, M0M1 can be awarded.
A1	Extract the remaining terms. $1-2/2$ may be missing and $1/n-2/n$ may be combined
dM1	Include the 1/2 and attempt a common denominator of the required form. Depends on both previous M marks
	$\dfrac{n^2+n-2}{4n(n+1)}$
A1	

Question Number	Scheme	Marks
1(a)	**Special Case:** $\frac{2}{r\left(r^2-1\right)}=\frac{2r}{r^2-1}-\frac{2}{r}$ seen, award M1A1A0 Award M1A0A0 provided of the form $\frac{2}{r\left(r^2-1\right)}=\frac{Ar}{r^2-1}-\frac{B}{r}$	
1(b)	Terms listed as described above – award M1M1. Further progress unlikely as too many terms needed to establish the cancellation.	