Question 8 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(i)	$\sum_{k=3}^{\infty} 6\times\left(\frac{1}{2}\right)^k$ $= \sum_{k=1}^{\infty} 6\times\left(\frac{1}{2}\right)^k - 6\left(\frac{1}{2}+\frac{1}{4}\right)$ $= \sum_{k=1}^{\infty} 6\times\left(\frac{1}{2}\right)^k - \frac{9}{2}$	M1	This mark is given for a method to find the sum to infinity of a GP
	$= \frac{3}{1-\frac{1}{2}} - \frac{9}{2}$	M1	This mark is given for a method to use a correct sum formula with a correct first term
	$= \frac{3}{2}$	A1	This mark is given for a correct value for the sum
(ii)	$\sum_{n=0}^{125} \log_4\left(\frac{k+3}{k+2}\right)$ $= \log_4 \frac{3}{2} + \log_4 \frac{4}{3} + \ldots + \log_4 \frac{127}{126} + \log_4 \frac{128}{127}$	M1	This mark is given for writing out at least four terms of the sum, including the first two and the last two
	$= \log_4 \frac{3\times4\times\ldots\times126\times127\times128}{2\times3\times4\times\ldots\times126\times127}$ $= \log_4 \frac{128}{2}$	M1	This mark is given for using the rules of logs and cancelling terms
	$= 3$	A1	This mark is given for a full proof to show the expression is equal to 3 as required