Question	Scheme	Marks	AOs
14(i)	Let the consecutive odd integers be $2n-1$ and $2n+1$ $(2n-1)^2+(2n+1)^2=4n^2-4n+1+4n^2+4n+1=\ldots$	M1	2.1
	$=8n^2+2$	A1	1.1b
	So $(2n-1)^2+(2n+1)^2$ is always 2 more than a multiple of 8	A1	2.4
		(3)	
(ii)	Assume that $\log_2 5$ is rational so that $\log_2 5=\frac{a}{b}$ where a and b are integers	M1	2.4
	$\log_2 5=\frac{a}{b}\Rightarrow 5=2^{\frac{a}{b}}$	M1	1.1b
	$5=2^{\frac{a}{b}}\Rightarrow 5^b=2^a$	A1	2.2a
	This is a contradiction as a power of 2 cannot equal a power of 5 so $\log_2 5$ must be irrational	A1	2.4
		(4)	
			(7 marks)

Notes

(i)
M1: Starts the proof by stating 2 consecutive odd numbers, squares and adds and collects terms
A1: Correct expression
A1: Completes the proof with no errors and an appropriate conclusion
(ii)
M1: Begins the proof by negating the statement e.g. $\log_2 5$ is rational
M1: Applies the definition of logs to eliminate the log
A1: Deduces that $5^b=2^a$
A1: A full and complete argument that completes the contradiction proof