Question	Scheme	Marks	AOs
6	When $n=1$ lhs $=\begin{pmatrix}1&1&2\\0&1&1\\0&0&1\end{pmatrix}$ rhs $=\begin{pmatrix}1&1&\frac{1}{2}\left(1^2+3\times1\right)\\0&1&1\\0&0&1\end{pmatrix}=\begin{pmatrix}1&1&2\\0&1&1\\0&0&1\end{pmatrix}$ So the statement is true for $n=1$	B1	2.2a
	Assume true for $n=k$ so $\begin{pmatrix}1&1&2\\0&1&1\\0&0&1\end{pmatrix}^k=\begin{pmatrix}1&k&\frac{1}{2}\left(k^2+3k\right)\\0&1&k\\0&0&1\end{pmatrix}$	M1	2.4
	$\begin{pmatrix}1&1&2\\0&1&1\\0&0&1\end{pmatrix}^{k+1}=\begin{pmatrix}1&k&\frac{1}{2}\left(k^2+3k\right)\\0&1&k\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&2\\0&1&1\\0&0&1\end{pmatrix}$	M1	1.1b
	$=\begin{pmatrix}1&k+1&2+k+\frac{1}{2}\left(k^2+3k\right)\\0&1&k+1\\0&0&1\end{pmatrix}$	A1	1.1b
	$2+k+\frac{1}{2}\left(k^2+3k\right)=2+\frac{5}{2}k+\frac{1}{2}k^2$ $=\frac{1}{2}\left(k^2+5k+4\right)=\frac{1}{2}\left(\left(k+1\right)^2+3\left(k+1\right)\right)$	A1	2.1
	If the statement is true for $n=k$ then it has been shown true for $n=k+1$ and as it is true for $n=1$, the statement is true for all positive integers n.	A1	2.4
		(6)	
			(6 marks)

Notes

B1: Shows the statement is true for $n=1$

M1: Makes a statement that assumes the result is true for $n=k$

M1: Attempts to multiply the correct matrices

A1: Correct matrix in terms of k

A1: Correct matrix in terms of $k+1$ including sufficient explanation for the element at the top right hand corner

A1: Correct complete conclusion