Q	Marking Instructions	AO	Marks	Typical Solution
17	Translates $f'\left(\frac{\pi}{6}\right)$ into $\lim_{h\to 0}\frac{\sin\left(\frac{\pi}{6}+h\right)-\sin\left(\frac{\pi}{6}\right)}{h}$	AO1.1a	M1	$f'\left(\frac{\pi}{6}\right)=\lim_{h\to 0}\left[\frac{\sin\left(\frac{\pi}{6}+h\right)-\sin\left(\frac{\pi}{6}\right)}{h}\right]$
	Uses sin $(A+B)$ identity to replace $\sin\left(\frac{\pi}{6}+h\right)$, to commence argument (at least two lines of argument seen)	AO2.1	M1	$=\lim_{h\to 0}\left[\frac{\sin\frac{\pi}{6}\cos h+\cos\frac{\pi}{6}\sin h-\sin\left(\frac{\pi}{6}\right)}{h}\right]$ $=\lim_{h\to 0}\left[\frac{\frac{1}{2}\cos h+\frac{\sqrt{3}}{2}\sin h-\frac{1}{2}}{h}\right]$
	Obtains correct two term expression involving cos h and sin h	AO1.1b	A1	$=\lim_{h\to 0}\left[\frac{1}{2}\left(\frac{\cos h-1}{h}\right)+\frac{\sqrt{3}}{2}\frac{\sin h}{h}\right]$
	Deduce what happens as $h\to 0$, for one part of 'their' expression using the limit of $\frac{\sin h}{h}$ OR by using small angles approximations	AO2.2a	R1	$=\lim_{h\to 0}\left[\frac{1}{2}\left(\frac{-2\sin^2\left(\frac{h}{2}\right)}{\frac{2h}{2}}\right)+\frac{\sqrt{3}}{2}\frac{\sin h}{h}\right]$ $=\left(\lim_{h\to 0}\frac{-\sin\left(\frac{h}{2}\right)}{2}\right)\left(\lim_{h\to 0}\frac{\sin\left(\frac{h}{2}\right)}{\left(\frac{h}{2}\right)}\right)+\frac{\sqrt{3}}{2}\lim_{h\to 0}\frac{\sin h}{h}$
	Deduce what happens as $h\to 0$, for the second part of 'their' expression using the limit of (cos h – 1)h OR by using small angle approximations	AO2.2a	R1	$=0\times 1+\frac{\sqrt{3}}{2}\times 1$ $=\frac{\sqrt{3}}{2}$
	Completes a rigorous argument leading to the correct exact value, with all the steps in the method clearly shown.	AO2.1	R1	
	Total		**6**	
	TOTAL		**100**	