Question	Scheme	Marks	AOs
6 (a)	$\tan 2\theta = \dfrac{2\tan\theta}{1-\tan^2\theta}$	B1	1.1a
	$\tan 3\theta = \dfrac{\tan 2\theta + \tan\theta}{1-\tan 2\theta \tan\theta} = \dfrac{\dfrac{2\tan\theta}{1-\tan^2\theta}+\tan\theta}{1-\dfrac{2\tan\theta}{1-\tan^2\theta}\times\tan\theta}$	M1	2.1
	$= \dfrac{2\tan\theta + \tan\theta\left(1-\tan^2\theta\right)}{1-\tan^2\theta - 2\tan\theta\times\tan\theta}$	M1	1.1b
	$= \dfrac{3\tan\theta - \tan^3\theta}{1-3\tan^2\theta}$ *	A1*	2.1
		(4)	
(b)	$\tan 3\beta = \dfrac{3\times\sqrt{6}-6\sqrt{6}}{1-3\times 6} = \dfrac{3}{17}\sqrt{6}$	M1 A1	1.1b 2.1
		(2)	
			(6 marks)

Notes:

(a)

B1: States or uses $\tan 2\theta = \dfrac{2\tan\theta}{1-\tan^2\theta}$. This may be unsimplified ie. $\tan 2\theta = \dfrac{\tan\theta+\tan\theta}{1-\tan\theta\tan\theta}$

M1: Attempt to use the identity $\tan(A+B)$ with $A=2\theta$ and $B=\theta$ or vice versa with $\tan 2\theta$ being replaced by $\dfrac{\tan\theta+\tan\theta}{1-\tan\theta\tan\theta}$. Condone sign slips only on $\tan 3\theta = \dfrac{\tan 2\theta+\tan\theta}{1-\tan 2\theta\tan\theta}$

M1: Attempts to create a simplified fraction by multiplying both numerator and denominator by $\left(1-\tan^2\theta\right)$ or equivalent

A1*: Shows careful work leading to $\dfrac{3\tan\theta-\tan^3\theta}{1-3\tan^2\theta}$

(b)

M1: Substitutes $\tan\beta=\sqrt{6}$ into the identity for $\tan 3\beta$ in terms of $\tan\beta$

A1: Shows careful work leading to $\tan 3\beta = \dfrac{3}{17}\sqrt{6}$