Q	Marking Instructions	AO	Marks	Typical Solution
8(a)	Recalls a correct trig identity, which could lead to a correct answer	AO1.2	B1	$(\text{LHS} \equiv)$ $\dfrac{\sin 2x}{1+\tan^2 x}$ $\equiv \dfrac{2\sin x \cos x}{1+\tan^2 x}$ $\equiv \dfrac{2\sin x \cos x}{\sec^2 x}$ $\equiv 2\sin x \cos x \cos^2 x$ $\equiv 2\sin x \cos^3 x$ $(\equiv \text{RHS})$
	Demonstrates a strategy for proving the identity, eg by converting all the terms on the LHS to cos and sin.	AO3.1a	M1	
	Concludes a rigorous mathematical argument to prove given identity **AG**	AO2.1	R1	
8(b)	Uses identity to write integrand in the form $a\sin 2\theta \cos^3 2\theta$	AO1.1a	M1	$\displaystyle\int \frac{4\sin 4\theta}{1+\tan^2 2\theta}\,d\theta = \int 8\sin 2\theta \cos^3 2\theta\, d\theta$ Let $u = \cos 2\theta$ then $\dfrac{du}{d\theta} = -2\sin 2\theta \Rightarrow \sin 2\theta = -\dfrac{1}{2}\dfrac{du}{d\theta}$ $I = -4\displaystyle\int u^3 \frac{du}{d\theta}\,d\theta$ $= -4\displaystyle\int u^3\, du$ $= -u^4 + c$ $= -\cos^4 2\theta + c$
	Correctly writes integrand as $8\sin 2\theta \cos^3 2\theta$	AO1.1b	A1	
	Selects an appropriate method for integrating, e.g. substitution $u = \cos 2\theta$, or by inspection PI by sight of $\cos^4 2\theta$	AO3.1a	M1	
	Obtains $k\int u^3\, du$ correctly PI by solution in form $k\cos^4 2\theta$, if by inspection	AO1.1a	M1	
	Obtains $-u^4$ or $-\cos^4 2\theta$ OE Only FT value of a	AO1.1b	A1F	
	Completes rigorous argument to obtain $-\cos^4 2\theta + c$ OE	AO2.1	R1	
	Total		**9**	