Question	Scheme	Marks	AOs
8(a)	$\frac{1-\cos 2\theta}{\sin^2 2\theta}=\frac{1-\left(1-2\sin^2\theta\right)}{\ldots}$ or $\frac{1-\cos 2\theta}{\sin^2 2\theta}=\frac{\ldots}{\left(2\sin\theta\cos\theta\right)^2}$	M1	1.1b
	$\frac{1-\cos 2\theta}{\sin^2 2\theta}=\frac{1-\left(1-2\sin^2\theta\right)}{\left(2\sin\theta\cos\theta\right)^2}=\frac{2\sin^2\theta}{4\sin^2\theta\cos^2\theta}=\ldots$	M1	2.1
	$=\frac{1}{2}\sec^2\theta$	A1	1.1b
		(3)	
(b)	$\frac{1-\cos 2x}{\sin^2 2x}=\left(1+2\tan x\right)^2\Rightarrow\frac{1}{2}\sec^2 x=1+4\tan x+4\tan^2 x$ $\Rightarrow 1+\tan^2 x=2+8\tan x+8\tan^2 x\Rightarrow 7\tan^2 x+8\tan x+1=0$	M1	3.1a
	$\tan x=-1,\ -\frac{1}{7}\Rightarrow x=\ldots$	M1	1.1b
	$x=-\frac{\pi}{4},\ -0.142$	A1 A1	1.1b 1.1b
		(4)	
			(7 marks)

Notes

(a)

M1: Applies $\cos 2\theta = 1 - 2\sin^2\theta$ in the numerator or $\sin 2\theta = 2\sin\theta\cos\theta$ in the denominator

M1: Applies $\cos 2\theta = 1 - 2\sin^2\theta$ in the numerator and $\sin 2\theta = 2\sin\theta\cos\theta$ in the denominator and simplifies to obtain $k\sec^2\theta$

A1: Correct expression

(b)

M1: Makes the connection with part (a), squares the RHS, applies $\sec^2 x = 1 + \tan^2 x$ and collects terms to obtain a 3TQ in $\tan x$

M1: Solves a 3TQ in $\tan x$ and obtains at least 1 value for x

A1: One correct value (allow -0.785 for $-\frac{\pi}{4}$)

A1: Both correct and no other values in range (allow -0.785 for $-\frac{\pi}{4}$)