Question	Scheme	Marks	AOs
13(a)	e.g. $\dfrac{\tan\theta\left(16+9\sin^2\theta\right)}{3\sin\theta+5\tan\theta}=\dfrac{16+9\sin^2\theta}{3\cos\theta+5}$	M1	2.1
	$=\dfrac{16+9(1-\cos^2\theta)}{3\cos\theta+5}$	M1	1.1b
	$\dfrac{25-9\cos^2\theta}{3\cos\theta+5}=\dfrac{(5-3\cos\theta)(5+3\cos\theta)}{3\cos\theta+5}$	M1	1.1b
	$=5-3\cos\theta$ *	A1*	2.2a
		(4)	
(b)	$5-3\cos 2x=\dfrac{4}{\cos 2x}-3\Rightarrow \ldots\cos^2 2x+\ldots\cos 2x+\ldots=0$	M1	1.1b
	$3\cos^2 2x-8\cos 2x+4=0$	A1	1.1b
	$\cos 2x=\dfrac{2}{3}\Rightarrow x=\ldots$	M1	2.1
	$x=\text{awrt } 24.1,\quad \text{awrt } 155.9$	A1	1.1b
		(4)	
		(8 marks)	

Notes

(a) There are various methods to prove the identity so the method marks may be awarded in a different order to how they have been listed below:

M1: Uses $\tan\theta=\dfrac{\sin\theta}{\cos\theta}$ to achieve an expression in $\sin\theta$ and $\cos\theta$

M1: Attempts to use $\pm\sin^2\theta\pm\cos^2\theta=\pm1$ to achieve an expression in $\cos\theta$ only

M1: Factorises $\left(9\cos^2\theta-25\right)$ into $\left(3\cos\theta+5\right)\left(3\cos\theta-5\right)$ or alternatively they may attempt to multiply $\left(3\sin\theta+5\tan\theta\right)\left(5-3\cos\theta\right)$ leading to four terms.

A1*: Achieves the given answer with all intermediate stages shown or alternatively if they multiply both sides by $3\sin\theta+5\tan\theta$ then look for both sides being equal and either a conclusion or a preamble with minimal conclusion e.g. tick/QED

(b)

M1: Sets $5-3\cos 2x=\dfrac{4}{\cos 2x}-3$ and rearranges the equation to achieve a 3-term quadratic in $\cos 2x$

A1: $3\cos^2 2x-8\cos 2x+4=0$

M1: A correct method to solve their 3-term quadratic in $\cos 2x$ and proceeds to find a value for x

A1: $x=\text{awrt } 24.1,\quad \text{awrt } 155.9$ and no others in the range