Question number	Scheme	Marks
10 (a)	$x = \tan^{-1}(-3) = -72$	M1
	$x = 108 \qquad x = 288$	A1 A1 (3)
(b)	$7\sin^2\theta + \sin\theta\cos\theta = 6(\sin^2\theta + \cos^2\theta)$	M1
	$\sin^2\theta + \sin\theta\cos\theta - 6\cos^2\theta = 0$	
	$\dfrac{\sin^2\theta}{\cos^2\theta} + \dfrac{\sin\theta}{\cos\theta} - 6 = 0$	M1
	$\tan^2\theta + \tan\theta - 6 = 0$	A1 cso (3)
(c)	$(\tan y + 3)(\tan y - 2) = 0$	M1
	$\tan y = -3 \qquad \tan y = 2$	A1
	$y = 108, 288 \qquad y = 63, 243$	A1ft A1 (4)
		Total 10 marks

Part	Mark	Guidance
(a)	M1	For using inverse tan to obtain any correct angle $\tan^{-1}(-3) \Rightarrow x = -71.565...^{\circ}$ Accept awrt $-72\,^{\circ}$
	A1	For **either** 108 **or** 288
	A1	For **both** 108 **and** 288
(b)	M1	Uses $\sin^2\theta + \cos^2\theta = 1$ on the given equation to obtain $7\sin^2\theta + \sin\theta\cos\theta = 6(\sin^2\theta + \cos^2\theta)$
	M1	For rearranging and dividing through by $\cos^2\theta$ with the $\dfrac{\sin\theta}{\cos\theta} = \tan\theta$ identity to obtain a 3TQ: $\dfrac{\sin^2\theta}{\cos^2\theta} + \dfrac{\sin\theta}{\cos\theta} - 6 = 0 \Rightarrow \left(\tan^2\theta + \tan\theta - 6 = 0\right)$
	ALT 1	
	M1	Divides the given equation through by $\cos^2\theta$ with the $\dfrac{\sin\theta}{\cos\theta} = \tan\theta$ identity to obtain $7\tan^2\theta + \tan\theta = \dfrac{6}{\cos^2\theta}$
	M1	Uses $\sin^2\theta + \cos^2\theta = 1$ to obtain $\tan^2\theta + 1 = \dfrac{1}{\cos^2\theta}$ and uses this result on the given equation and rearranges to achieve a 3TQ to obtain $7\tan^2\theta + \tan\theta = 6\left(1 + \tan^2\theta\right) \Rightarrow \left(\tan^2\theta + \tan\theta - 6 = 0\right)$
	A1	For obtaining the given expression $\tan^2\theta + \tan\theta - 6 = 0$ * in full. **Note: This is a show question, there must be no errors in the solution.**
	ALT 2	
	M1	Uses the identity $\dfrac{\sin\theta}{\cos\theta} = \tan\theta$ with $\tan^2\theta + \tan\theta - 6 = 0$ to achieve $\dfrac{\sin^2\theta}{\cos^2\theta} + \dfrac{\sin\theta}{\cos\theta} - 6 = 0$ and multiplies through by $\cos^2\theta$ to obtain $\sin^2\theta + \sin\theta\cos\theta - 6\cos^2\theta = 0$
	M1	Uses $\sin^2\theta + \cos^2\theta = 1$ to obtain $\sin^2\theta + \sin\theta\cos\theta - 6\left(1 - \sin^2\theta\right) = 0$ and rearranges to obtain $7\sin^2\theta + \sin\theta\cos\theta = 6$
	A1 cso	For obtaining the given expression $7\sin^2\theta + \sin\theta\cos\theta = 6$ in full. **Note: This is a show question, there must be no errors in the solution.**
(c)	M1	For changing $7\sin^2 y + \sin y\cos y = 6$ to $\tan^2 y + \tan y - 6 = 0$ [this step must be correct] and then attempting to solve the 3TQ by any method.
	A1	For $\tan y = -3$ and $\tan y = 2$
	A1ft	For **both** $y = 108$ **and** 288 (ft from (a)) **Do not ft angles out of range**
	A1	For **both** $y = 63$ **and** 243

Rounding errors: Penalise rounding only once in this question when first seen provided angles round to 108, 288, 63 or 243

Extra angles: Deduct one A mark for any extra angles within range. Ignore angles outside of range.