Question			Answer	Marks	AO	Guidance
8	(a)		**DR** $\left[\cos x+\sqrt{3}\sin x = R\sin\left(x+\alpha\right)\right]$ $\Rightarrow R\cos\alpha=\sqrt{3}\ ,\ R\sin\alpha=1$	**M1**	**1.1a**	M0 if *R* missing but next M mark available. Must be using α and not *x*.
			$\tan\alpha=\dfrac{1}{\sqrt{3}}$	**M1**	**1.1** **1.2**	Allow other equivalent methods using *their* values of sin and cos e.g. drawing a right angled triangle or simply dividing the two equations. Allow equivalent surds
			$\left[\alpha\right]=\dfrac{\pi}{6}$	**A1**		Dependent on M2
			$\Rightarrow R^2=4, R=2$	**B1**	**1.1**	soi anywhere
				[4]		
8	(b)		**DR** $\cos x+\sqrt{3}\sin x=\sqrt{3}\Rightarrow 2\sin\left(x+\dfrac{\pi}{6}\right)=\sqrt{3}$	**M1**	**3.1a**	Use of *their* result from **(a)**
			$\sin\left(x+\dfrac{\pi}{6}\right)=\dfrac{\sqrt{3}}{2}$	**M1**	**1.1**	Value for a trig function following on from first step
			$x+\dfrac{\pi}{6}=\dfrac{\pi}{3}$ or $\dfrac{2\pi}{3}$	**M1**	**1.1**	At least one value for *their* $x+\dfrac{\pi}{6}$. Condone use of inequality symbols if recovered. Condone working consistently in degrees up to this point.
			$x=\dfrac{\pi}{6}\ ,\ \dfrac{\pi}{2}$	**A1**	**1.1**	Both roots correct in radians only. If extra roots then A0 Candidates who square both sides and solve from there, should check their solutions and discard any erroneous ones. This gains a maximum of M3A0. If no check then M2A0 max.
				[4]		

Q8a. We are expecting to see the 2 equations $R\cos\alpha = \sqrt{3}$ and $R\sin\alpha = 1$ for the first M1. Must be in terms of α.
The B1 mark is for finding R=2. In addition to the method in the MS, they might find R first and use it to solve, say $2\sin\alpha = 1$, leading to $\alpha = \pi/6$ for the M1A1. The A1 is dependent on scoring M2.

Award M0 if the R is missing. They can still get next M1 but not the A1 (as an M0 has already been given – see section 6c of the marking instructions). M0M1A0B1 is likely to be quite common.

They can get M1 A0 if they draw a right-angled triangle and label it incorrectly giving $\tan\alpha = \sqrt{3}$

Q8b. For the first M1 they use *their* result from part (a) to get an equation equal to $\sqrt{3}$. An incorrect value of α from Q8a means they can also access the next two M1s as per the MS.
The second M1 is for getting *their* trig expression = a value (probably $\sqrt{3}/2$).
The third M1 is for solving *their* equation to get at least one solution.
The A1 is given for the two correct values in radians and no others.

Note that candidates who square both sides and solve from there will get extraneous solutions so any of those must be discarded. There is a maximum of M3A0 if they do discard erroneous solutions but only M2A0 if they do not.