Question	Answer	Marks	Guidance
9(a)(iii)	$2+12t=158$ and $5-5t=-48$ $t=13$, $t=10.6$ soi	**M1**	Either for finding two values of t or for finding one value of t and substitute to obtain a position vector.
	Times are different so P does not pass through the given point or time calculated gives an inconsistent position vector	**A1**	For a valid conclusion
9(b)	$\overrightarrow{AB}=\mathbf{b}-\mathbf{a}$ and $\overrightarrow{AC}=\mathbf{c}-\mathbf{a}$	**B1**	
	$4(\mathbf{b}-\mathbf{a})=\mathbf{c}-\mathbf{a}$ oe	**M1**	For substitution into a valid equation from *their* ratio. **FT** on *their* $\overrightarrow{AB}$ and *their* $\overrightarrow{AC}$
	$\mathbf{c}=4\mathbf{b}-3\mathbf{a}$	**A1**	
	Alternative method		
	$\overrightarrow{AB}=\mathbf{b}-\mathbf{a}$ and $\overrightarrow{AC}=4\mathbf{b}-4\mathbf{a}$ oe	**B1**	
	$\left(\overrightarrow{OC}=\right)\ \mathbf{c}=\mathbf{a}+4\mathbf{b}-4\mathbf{a}$	**M1**	**FT** on *their* $\overrightarrow{AB}$ and *their* $\overrightarrow{AC}$
	$\mathbf{c}=4\mathbf{b}-3\mathbf{a}$	**A1**	
10(a)	$\cos\theta=x-2$ and $\sin\theta=\frac{2}{y}$ soi	**B1**	
	$(x-2)^2+\frac{4}{y^2}=1$	**M1**	For a correct attempt to use $\cos^2\theta+\sin^2\theta=1$ or other relevant identity
	$y^2=\frac{4}{1-(x-2)^2}$ oe	**M1**	**Dep** for attempt to rearrange to obtain y^2
	$y=\frac{2}{\sqrt{1-(x-2)^2}}$ or $\frac{2}{\sqrt{4x-x^2-3}}$ oe	**A1**	Must be positive
	Alternative method		
	$\theta=\cos^{-1}(x-2)$ and $\theta=\sin^{-1}\left(\frac{2}{y}\right)$	**B1**	
	$\cos^{-1}(x-2)=\sin^{-1}\left(\frac{2}{y}\right)$	**M1**	
	$y=\frac{2}{\sin\left(\cos^{-1}(x-2)\right)}$	**2**	**Dep M1** for correct attempt to rearrange to obtain y = ...

Question	Answer	Marks	Guidance
10(b)	$\tan\frac{\phi}{2}=\sqrt{3}$ or $\sin\frac{\phi}{2}=\frac{\sqrt{3}}{2}$ or $\cos\frac{\phi}{2}=\frac{1}{2}$	**B1**	
	$\frac{\phi}{2}=\frac{\pi}{3}$ or awrt 1.05	**M1**	**Dep** for a correct attempt to solve *their* equation, must be using $\frac{\phi}{2}$.
	$\phi=\frac{2\pi}{3}$ or awrt 2.09	**M1**	**Dep** for correct order of operations, may be implied by one correct solution.
	$\phi=-\frac{10\pi}{3},-\frac{4\pi}{3},\frac{2\pi}{3},\frac{8\pi}{3}$ or $-10.5,\ -4.19,\ 2.09,\ 8.38$	**A2**	**A1** for a correct pair of solutions. **A1** for a second correct pair of solutions and no extra solutions within the range. Allow greater accuracy if decimals used.