Question	Answer	Marks	Guidance
8	$A\ (2.5,\ 0)$ soi	**B1**	
	$C\ (4.5,\ 0)$ soi	**B1**	
	$2x^2 + x - 21 = 0$	**M1**	For a correct attempt to find the intersection of the straight line and the curve. Must have attempt to solve the resulting quadratic equation to obtain x = .
	$x = 3,\ \left[-\frac{7}{2}\right]$	**A1**	
	$B\left(3,\ \frac{1}{2}\right)$ soi	**A1**	
	$\int\left(2 - \frac{3}{x-1}\right) \mathrm{d}x = 2x - 3\ln(x-1)$	**B1**	
	e.g. $\left[2x - 3\ln(x-1)\right]_{\frac{5}{2}}^{3} =$ $(6 - 3\ln 2) - \left(5 - 3\ln\frac{3}{2}\right)$	**M1**	**Dep** for application of appropriate limits e.g. $x = their\ \frac{5}{2}$ and $x = their\ 3$ $x = their\ \frac{5}{2}$ and $x = their\ \frac{9}{2}$ $x = their 3$ and $x = their\ \frac{9}{2}$ Integral must be in the form $ax + b\ln(x-1)$
	$1 + 3\ln\frac{3}{4}$ oe	**A1**	
	Area of an appropriate triangle	**B1**	**FT** on $\frac{1}{2} \times their\ \frac{1}{2} \times their\ \frac{3}{2}$ oe $\frac{1}{2} \times their 2 \times their\ \frac{2}{3}$ oe Must be appropriate for *their* method
	Area = $\frac{11}{8} + \ln\frac{27}{64}$	**2**	**B1** for each correct term
9(a)(i)	$\begin{pmatrix}2\\5\end{pmatrix}$	**B1**	
9(a)(ii)	Velocity vector = $\begin{pmatrix}12\\-5\end{pmatrix}$ soi by correct speed	**B1**	
	Speed = 13	**B1**	

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 = ...