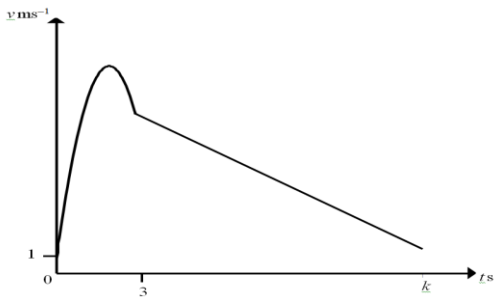
Question	Answer	Marks	Partial Marks
9(b)(ii)	$g^{-1}(x)=\frac{1}{2}\left(5-e^{\frac{x}{3}}\right)$	**2**	**M1** for an attempt at the full method to find the inverse function with at most one sign or arithmetic slip
9(b)(iii)	Domain: $x \leqslant 3\ln 5$	**B1**	
	Range: $0 \leqslant g^{-1} < 2.5$	**B1**	
10(a)	$\overrightarrow{AB}=\mathbf{b}-\mathbf{a}$	**B1**	
	$\overrightarrow{OC}=\mathbf{a}+3(\mathbf{b}-\mathbf{a})$ or $\mathbf{b}+2(\mathbf{b}-\mathbf{a})$	**B1**	**FT** on *their* $\mathbf{b}-\mathbf{a}$
	$\overrightarrow{OC}=3\mathbf{b}-2\mathbf{a}$	**B1**	
10(b)	$\overrightarrow{OD}=4.5\mathbf{a}$ or $\overrightarrow{AD}=3.5\mathbf{a}$	**B1**	Allow unsimplified
	$\overrightarrow{DC}=their(3\mathbf{b}-2\mathbf{a})-their 4.5\mathbf{a}$ or $\overrightarrow{CD}=their 4.5\mathbf{a}-their(3\mathbf{b}-2\mathbf{a})$	**B1**	**FT** Allow unsimplified
	$\overrightarrow{OE}=their 4.5\mathbf{a}+\mu\times their(3\mathbf{b}-6.5\mathbf{a})$ oe or $\overrightarrow{OE}=their(3\mathbf{b}-2\mathbf{a})+\nu\times their(6.5\mathbf{a}-3\mathbf{b})$	**M1**	
	$\mu=\frac{9}{13}$ oe or $\nu=\frac{4}{13}$ oe	**A1**	
	$\lambda=\frac{27}{13}$	**A1**	
11(a)	$v=1+12t-3t^2$	**B1**	
	$v=12-\frac{2}{3}t$	**B1**	
		**2**	**B1** for correct shape for $0 \leqslant t \leqslant 3$, with v-intercept of 1 and end point (3, 10) soi and maximum point **B1** for a line with negative gradient for $3 \leqslant t \leqslant k$, start point (3, 10) soi and end point above the t-axis

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Question	Answer	Marks	Partial Marks
11(b)	When $t = 3$, $s = 30$	**B1**	
	$\frac{1}{2}(10+12-\frac{2}{3}k)(k-3)=57-30$ oe or $12k-\frac{k^2}{3}-3\ [-30]=57\ [-30]$ oe	**2**	**M1** for attempt at area using $t=k$
	$k = 6$ or $k = 30$	**2**	**A1** for $-\frac{1}{3}k^2+12k-60[=0]$ or $k^2-36k+180[=0]$ oe
	$k = 6$	**A1**	as v is negative when $k = 30$
12	$\frac{dy}{dx}=-\frac{8}{x^3}+a$ oe	**B1**	
	When $x=2$, $\frac{dy}{dx}=a-1$ soi	**B1**	**FT** on *their* $\frac{dy}{dx}$
	$\frac{-1}{their(a-1)}=-\frac{1}{4}$ or *their* $(a-1) = 4$	**M1**	**FT** on *their* $(a-1)$
	$a=5$	**A1**	
	When $x = 2$, $b=2+4(their\ 18)$ oe	**M1**	**Dep**
	$b = 74$	**A1**	

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