Question	Answer	Marks	Guidance
7(a)	$\frac{e^{1-3x}(\cos x-\sin x)-(\sin x+\cos x)\times(-3)e^{1-3x}}{(e^{1-3x})^2}$	**4**	**B1** for $-3e^{1-3x}$ **B1** for $\cos x-\sin x$ **M1** for differentiation of quotient or equivalent correct product **A1 FT** on *their* $-3e^{1-3x}$ and *their* $\cos x-\sin x$
7(b)	$\int\left(\sec^2 3x\right)dx$	**M1**	Use of $\sec^2 3x=1+\tan^2 3x$
	$\frac{1}{3}\tan 3x+c$ oe	**2**	**A1** if + *c* omitted
8	$(1-6y)^2-8y^2=-2y+12y^2$ oe	**M1**	Equation in one variable only, in any form. Allow one arithmetical error
	$16y^2-10y+1[=0]$	**A1**	
	$(2y-1)(8y-1)$ [= 0]	**M1**	Attempt to factorise or use formula for *their* 3-term quadratic
	$y=\frac{1}{2}$, $x=-2$ $y=\frac{1}{8}$, $x=\frac{1}{4}$	**2**	Correct pairs seen or implied **A1** for any two correct values
9(a)	As *v*–*t* graph but negative portion reflected in *x*-axis	**B1**	
9(b)	Straight line with positive gradient	**B1**	
	Straight line starting at *O*	**B1**	

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Question	Answer	Marks	Guidance
10	Equation of normal $y = -x + 3$ soi	**2**	**M1** for a correct attempt to obtain an equation of the normal using calculus and perpendicular gradient
	$-x+3=x^2-9x+18$ or $x^2-9x+18=0$	**M1**	
	$x = 3$ [or 5]	**A1**	
	$\int_3^5\left[(-x+3)-(x^2-9x+18)\right]dx$ $\pm\left[\left(\frac{-x^2}{2}+3x\right)-\left(\frac{x^3}{3}-\frac{9x^2}{2}+18x\right)\right]_3^5$ or $\pm\left[-\frac{x^3}{3}+4x^2-15x\right]_3^5$	**4**	**M1** for attempt to subtract and integrate Allow if order is reversed **FT** on *their* normal equation for **M1** **A1** for $\frac{x^3}{3}-\frac{9x^2}{2}+18x$ soi **A1** for $\frac{-x^2}{2}+3x$ soi Ignore limits at this stage
	$\pm\left(-\frac{125}{3}+100-75-(-9+36-45)\right)$ oe	**2**	**M1 dep** for attempt to use *their* limits Allow one arithmetic error for **M1** May include area of triangle rather than area using the normal
	$\frac{4}{3}$	**A1**	Curve – line gives $-\frac{4}{3}$, final answer must be $\frac{4}{3}$
	Alternative method		
	$x^2-9x+18=0$	**(M1)**	
	$x = 3$ [or 5]	**(A1)**	
	$\int_3^5\left[(x^2-9x+18)\right]dx$ $=\left[\frac{x^3}{3}-\frac{9x^2}{2}+18x\right]_3^5$	**(3)**	**M1** for attempt to integrate **A1** for one term correct soi Ignore limits at this stage
	$\pm\left(\frac{125}{3}-\frac{225}{2}+90-(9-\frac{81}{2}+54)\right)$ soi	**(2)**	**M1 dep** for attempt to use *their* limits Allow one arithmetic error for **M1**
	Area of triangle $= \frac{1}{2}\times 2\times 2$	**(2)**	**M1** for a complete method
	Shaded area $= \frac{10}{3} - 2 = \frac{4}{3}$	**(2)**	**M1** for a difference between *their* areas Must be positive for **A1**

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