

Q	Marking instructions	AO	Marks	Typical solution
13(a)	Obtains $32(4t+1)$ Can be unsimplified OE	1.1b	B1	$\frac{dx}{dt} = 32(4t+1)$
	Obtains $-4e^{-4t}$	1.1b	B1	$\frac{dy}{dt} = -4e^{-4t}$
	Uses their $\frac{dy}{dt} \div$ their $\frac{dx}{dt}$ to obtain an expression for $\frac{dy}{dx}$ Can be unsimplified ISW ACF	3.1a	B1F	$\frac{dy}{dx} = \frac{-4e^{-4t}}{32(4t+1)} = \frac{-e^{-4t}}{8(4t+1)}$
	Subtotal		3	

Q	Marking instructions	AO	Marks	Typical solution
13(b)	Substitutes $t = 0$ to obtain values for x, y and their $\frac{dy}{dx}$ PI by correct values	3.1a	M1	$t = 0$ $x = 4$ $y = 1$
	Obtains at least two of $x = 4$, $y = 1$ or $\frac{dy}{dx} = -\frac{1}{8}$	1.1a	M1	$\frac{dy}{dx} = -\frac{1}{8}$
	Obtains $y - 1 = -\frac{1}{8}(x - 4)$ ACF ISW	1.1b	A1	$y - 1 = -\frac{1}{8}(x - 4)$
	Subtotal		3	

Q	Marking instructions	AO	Marks	Typical solution
13(c)	Eliminates t correctly to form a Cartesian equation. May use positive or negative square root or both. Condone a sign error when rearranging either parametric equation.	3.1a	M1	$4t + 1 = \frac{\pm\sqrt{x}}{2}$ The positive square root is used since $-\frac{1}{4} \leq t \leq 0$ $4t = \frac{\sqrt{x} - 2}{2}$ $y = e^{\frac{\sqrt{x} - 2}{2}}$
	Obtains $y = e^{1 - \frac{\sqrt{x}}{2}}$ or $y = e^{1 + \frac{\sqrt{x}}{2}}$ or $y = e^{\pm \frac{\sqrt{x}}{2}}$ OE May be unsimplified.	1.1a	M1	
	Gives a valid explanation for selecting the appropriate square root for example $-\frac{1}{4} \leq t$ or $y \leq e$ AND Obtains $y = e^{1 - \frac{\sqrt{x}}{2}}$ OE	2.4	R1	
	Subtotal		3	

	Question 13 Total		9	
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