

Q	Marking Instructions	AO	Marks	Typical Solution
8(a)	Recalls and applies gradient rule for e^{kx}	1.2	B1	Gradient = $4e^{4a}$ Equation is $y - e^{4a} = 4e^{4a}(x - a)$
	Uses their gradient in line equation formula	1.1a	M1	
	Obtains correct equation, any form, FT their gradient.	1.1b	A1F	
	Subtotal		3	
8(b)	Substitutes $x = 0$ and $y = 0$ into their line equation	1.1a	M1	$x = 0$ and $y = 0$ gives $0 = e^{4a}(1 - 4a)$ $a = \frac{1}{4}$
	Finds correct value of a for their equation	1.1b	A1F	
	Subtotal		2	
8(c)	Deduces correct lower limit	2.2a	B1	Any negative gradient cuts curve $0 \leq m$ With $a = \frac{1}{4}$ contact point is $(\frac{1}{4}, e)$ Gradient $(0, 0)$ to $(\frac{1}{4}, e)$ is $4e$ $0 \leq m < 4e$
	Deduces correct upper limit based on their answers to (a) and (b)	2.2a	M1	
	Obtains correct inequality	1.1b	A1	
	Subtotal		3	
	Question Total		8	