Question Number	Scheme	Marks
6(a)(i)	$\frac{\mathrm{d}y}{\mathrm{d}x} = 4\mathrm{e}^{2x} + 2(4x-3)\mathrm{e}^{2x}$	M1A1A1 (3)
(ii)	$(4x-3)\frac{\mathrm{d}y}{\mathrm{d}x} = (4x-3)(8x-2)\mathrm{e}^{2x} = (8x-2)y$ *	M1A1cso (2)
(b)	$\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{5\cos 5x \times (x-3)^2 - \sin 5x \times 2(x-3)}{(x-3)^4}$	M1A1A1 (3)
ALT	Using product rule:	
	$y = (x-3)^{-2}\sin 5x$	M1
	$\frac{\mathrm{d}y}{\mathrm{d}x} = -2(x-3)^{-3}\sin 5x + 5(x-3)^{-2}\cos 5x$	A1A1
		[8]
(a)(i)		
M1	Use product rule to differentiate the given expression. Must have 2 terms added. One to be of the form $k\mathrm{e}^{2x}$ and the other of the form $k'(4x-3)\mathrm{e}^{2x}$ where k' = 1 or 2	
A1	Either term correct	
A1	Second term correct	
NB	No simplification needed for these 3 marks	
ALT	$y = 4x\mathrm{e}^{2x} - 3\mathrm{e}^{2x} \Rightarrow \frac{\mathrm{d}y}{\mathrm{d}x} = 4\mathrm{e}^{2x} + 8x\mathrm{e}^{2x} - 6\mathrm{e}^{2x}$	
	M1 Expand the given expression and differentiate using the product rule for $4x\mathrm{e}^{2x}$ A1 Any 2 terms correct; A1 Third term correct.	
NB	No simplification needed for these 3 marks	
(ii)		
M1	Use their result from (i) to obtain an expression for $(4x-3)\frac{\mathrm{d}y}{\mathrm{d}x}$. No need to simplify.	
A1cso	Correct **given** result obtained with no errors in the working. Can start with LHS and show equal to the RHS or vice versa or can start with each side and "meet in the middle"	
(b)		
M1	Attempt the quotient rule. The denominator must be $(x-3)^4$ and the numerator must be of the form $\left(k\cos 5x \times (x-3)^2 - \sin 5x \times l(x-3)\right)$ $k = \pm 5$ or ± 1, $l = 1$ or 2 (ie sine may have been differentiated to $-$ cosine)	
A1	One fully correct term in numerator.	
A1	All fully correct.	
ALT		
M1	Rewrite without a quotient and apply the product rule obtaining 2 terms of the form shown	
A1	Either term correct	
A1	Second term correct	
	No need to simplify	