Question			Answer	Marks	AO	Guidance
4	(a)		$xe^{1-3x} - 0.2$ evaluated for any two values of x that give results with opposite signs.	M1	3.1a	Values of iterates not needed, i.e. condone <0 and >0 etc. but signs (and values if given) must be correct to 1sf – see table.
			$x = 0.79$ (2dp)	B1	1.1	cao (Allow this mark even with no/insufficient working).
			($x = 0.79$ to 2 dp) because the change of sign occurs between 0.785 and 0.795.	A1	2.2a	By showing two values between 0.785-0.795 with opposite signs Values of iterates not needed, i.e. condone <0 and >0 etc, but if given must be correct to 1sf
						e.g. $x = 0.79 \Rightarrow y = 0.0007$ **and** $x = 0.795 \Rightarrow y = -0.0009$

x	$xe^{1-3x} - 0.2$
0.1	0.00138
0.5	0.10327
0.7	0.03301
0.75	0.01488
0.78	0.00424
0.785	0.00249
0.786	0.00214
0.787	0.00179
0.788	0.00144
0.789	0.00109
0.79	0.00074
0.791	0.00040
0.792	0.00005
0.793	-0.00030
0.794	-0.00065
0.795	-0.00099
0.796	-0.00134
0.797	-0.00169
0.798	-0.00203
0.799	-0.00238
0.8	-0.00272
1	-0.06466

[3]

(Note that exact root is 0.792…)

Question			Answer	Marks	AO	Guidance
4	**(b)**		$\dfrac{dy}{dx} = e^{1-3x} + x(-3)e^{1-3x}(= 0)$	**M1**	**3.1a**	For an attempt at differentiating using the product rule, with at least one term correct (their derivative must have two terms).
			e^{1-3x} is never 0, hence can divide by it $(e^{1-3x}(1-3x) = 0)$ $(\rightarrow 1 - 3x = 0)$	**B1**	**2.1**	May be implied by not giving a corresponding solution (provided another solution for x is reached). (NB this mark can be gained following M0 provided their derivative has e^{1-3x} as a factor)
			$x = \dfrac{1}{3}$	**A1**	**1.1**	Not decimal, www (i.e. must come from a correct derivative)
				[3]		
4	**(c)**		**DR** $\displaystyle\int_0^1 x e^{1-3x}dx = \left[x\dfrac{e^{1-3x}}{-3}\right]_0^1 - \int_0^1 \dfrac{e^{1-3x}}{-3}\,dx$ oe	**M1**	**3.1a**	M1 for attempting integration by parts with at least one term correct, must see limits (condone swapped limits, may appear later). Must have two terms.
				A1	**2.1**	A1 for both terms correct
			$= \left[x\dfrac{e^{1-3x}}{-3}\right]_0^1 - \left[\dfrac{e^{1-3x}}{9}\right]_0^1$	**A1**	**2.1**	A1 for both terms correct after 2nd integral performed
			$= \dfrac{1}{9}e - \dfrac{4}{9}e^{-2}$ or $\dfrac{e^3 - 4}{9e^2}$ oe	**A1**	**1.1**	Need not be simplified, isw any incorrect attempts to simplify
				[4]		