

Q	Marking Instructions	AO	Marks	Typical Solution
7	Integrates using integration by parts	AO3.1a	M1	$y = \int (x-1)e^x dx$
	Applies integration by parts formula correctly to either of $(x-1)e^x$ or xe^x	AO1.1a	M1	$u = x-1 \quad \frac{dv}{dx} = 1$ $\frac{dv}{dx} = e^x \quad v = e^x$
	Obtains fully correct integral, condone missing constant.	AO1.1b	A1	$y = (x-1)e^x - \int e^x dx$
	Explains clearly why the minimum y value is e with reference to the range of the function OE	AO2.4	E1	$y = (x-1)e^x - e^x + c$ Range $\geq e \Rightarrow$ at min $y = e$
	Uses $\frac{dy}{dx} = 0$ to find x coordinate of minimum	AO1.1a	M1	Min point when $\frac{dy}{dx} = 0 \therefore x = 1$ So curve passes through (1, e)
	Deduces that the curve passes through the point (1, e)	AO2.2a	A1	$e = (1-1)e^1 - e^1 + c$ $c = 2e$
	Uses their minimum point to find their c	AO1.1a	M1	$\therefore f(x) = (x-2)e^x + 2e$
	States the correct equation in any correct form Condone y instead of $f(x)$ CAO	AO1.1b	A1	
	Total		8	