Question	Answer	Marks	Guidance
12(a)	$\frac{dy}{dx} = \frac{x^2\left(\frac{1}{x}\right) - 2x\ln 3x}{x^4}$ oe $\frac{dy}{dx} = x^{-2} \times \frac{3}{3x} + \frac{-2}{x^3} \times \ln 3x$	**3**	**B1** for $\frac{1}{x}$ or $\frac{3}{3x}$ **M1** for a correct attempt at a quotient or a product **A1** for all terms apart from log derivative correct.
	$\frac{1-2\ln 3x}{x^3}$	**A1**	
12(b)	$\frac{\ln 3x}{x^2} = \int \frac{1-2\ln 3x}{x^3}\,dx$ $2\int \frac{\ln 3x}{x^3}\,dx = \int \frac{1}{x^3}\,dx - \frac{\ln 3x}{x^2}$ oe	**M1**	For using integration as a reverse of differentiation (reverse of part **(a)**) Allow using *their A* and *B* but do not allow any extra terms added or subtracted from *their* part **(a)**
	$\left(\int \frac{1}{x^3}\,dx = \right) -\frac{1}{2x^2}$ oe nfww	**B1**	**FT** on their *A*
	$-\frac{1}{4x^2} - \frac{\ln 3x}{2x^2} + c$ oe	**2**	**M1** dep for rearranging simplification **and** an attempt to integrate ax^{-3}. Allow if $+c$ is missing **A1** must include +c

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