Question Number	Scheme	Marks
1	$\int 2x\ln(3x)\,\mathrm{d}x = x^2\ln(3x) - \int \frac{1}{x}\times x^2\,\mathrm{d}x$	M1
	$= ... + ...x^2$	**d**M1
	$x^2\ln(3x) - \frac{x^2}{2}$	A1
	$9\ln 9 - \frac{9}{2} - \left(\ln 3 - \frac{1}{2}\right) = 17\ln 3 - 4$	**dd**M1A1
		(5 marks)

Mark positively in this question and do not penalise poor notation such as a missing "d*x*" or spurious integral signs, "+ *c*" etc. as long as the intention is clear.

M1: Attempts integration by parts the right way round achieving $...x^2\ln(3x) \pm ... \int \frac{1}{x}\times x^2\,\mathrm{d}x$

(You do not need to be concerned how they arrive at this)
You may see an attempt at the "DI method" e.g.

	D	I
+	$\ln(3x)$	$2x$
–	$\frac{1}{x}$	x^2

but the same condition applies e.g. they must reach $...x^2\ln(3x) \pm ... \int \frac{1}{x}\times x^2\,\mathrm{d}x$ which may be implied by e.g. $\int 2x\ln(3x)\,\mathrm{d}x = ...x^2\ln(3x) \pm ...x^2$

(In such cases, this mark and the following mark will be scored at the same time)

Condone e.g. $...\ln 3x.x^2 \pm ... \int \frac{1}{x}\times x^2\,\mathrm{d}x$

dM1: For $...x^2\ln(3x) \pm ... \int \frac{1}{x}\times x^2\,\mathrm{d}x = ... \pm ...x^2$. **Depends on the previous method mark.**

A1: Fully correct integration: $x^2\ln(3x) - \frac{x^2}{2}$ or unsimplified equivalent e.g. $2\left\{\frac{1}{2}x^2\ln(3x) - \frac{x^2}{4}\right\}$ with or without a constant of integration.

Any necessary brackets must be present unless they are implied by subsequent work.

Condone e.g. $\ln(3x).x^2 - \frac{x^2}{2}$ but not e.g. $\ln(3x^3) - \frac{x^2}{2}$ unless $\ln(3x).x^2 - \frac{x^2}{2}$ is seen first.

ddM1: Substitutes in the limits 3 **and** 1 into an expression of the form $\alpha x^2\ln(3x) + \beta x^2$ and subtracts the correct way round. Condone missing brackets e.g. $9\ln 9 - \frac{9}{2} - \ln 3 - \frac{1}{2}$

Condone slips in substitution provided the intention is clear.

They may work on each term separately e.g.

$$\left[x^2\ln(3x) - \frac{x^2}{2}\right]_1^3 = \left[x^2\ln(3x)\right]_1^3 - \left[\frac{x^2}{2}\right]_1^3 = 9\ln 9 - \ln 3 - \left(\frac{9}{2} - \frac{1}{2}\right)$$

It is dependent on the two previous method marks.

A1: $17\ln 3 - 4$ Following correct work. Condone $17\ln 3 + -4$