Note that you may see attempts at the integration via D & I methods. These are essentially the same as via the main method. So still expect to see variations on $-\frac{1}{x}\ln x+\int\frac{1}{x^2}\,\mathrm{d}x$ for the M1, A1.

All stages of working must be seen (bold sentences), so there is an expectation that the intermediate step is seen.

If $\int\frac{\ln x}{x^2}\mathrm{d}x==\frac{-1}{x}\ln x-\frac{1}{x}(+c)$ appears without any justification score this 1,0,1, 0 followed by potentially 1,0

Question Number	Scheme	Marks
3	Differentiates wrt x $\quad 3^x \ln 3 + 6\underline{\underline{\frac{dy}{dx}}} = \frac{3}{2}y^2 + 3xy\underline{\frac{dy}{dx}}$ Substitutes (2, 3) **AND** rearranges to get $\frac{dy}{dx}$ or vice versa $\Rightarrow 9\ln 3 + 6\frac{dy}{dx} = \frac{27}{2} + 18\frac{dy}{dx} \Rightarrow \frac{dy}{dx} = \frac{9\ln 3 - \frac{27}{2}}{12} = \frac{6\ln 3 - 9}{8} = \frac{-9 + \ln 729}{8}$	B1 $\underline{\underline{\text{B1}}}, \underline{\text{M1}}, \text{A1}$ M1 A1, A1 **(7)** **(7 marks)**

B1: Differentiates $3^x \rightarrow 3^x \ln 3$ or equivalent such as $e^{x\ln 3} \rightarrow e^{x\ln 3}\ln 3$

B1: Differentiates $6y \rightarrow 6\frac{dy}{dx}$

M1: Uses the product rule to differentiate $\frac{3}{2}xy^2$.

Look for sight of $\underline{py^2 + qxy\frac{dy}{dx}} \quad p, q > 0$

A1: A completely correct differential. It need not be simplified.

Variations on this include $3^x \ln 3 dx + \underline{\underline{6dy}} = \underline{\frac{3}{2}y^2 dx + 3xydy}$

Note that $\frac{dy}{dx} = 3^x \ln 3 + 6\underline{\underline{\frac{dy}{dx}}} = \underline{\frac{3}{2}y^2 + 3xy\frac{dy}{dx}}$ is A0 unless there is later recovery to the correct answer

M1: Substitutes $x = 2,\ y = 3$ into their expression to find a 'numerical' value for $\frac{dy}{dx}$

The expression must contain only two $\frac{dy}{dx}$ terms, one from differentiating $6y$, the other from differentiating $\frac{3}{2}xy^2$

Alternatively rearranges to find $\frac{dy}{dx}$ and substitutes in $x = 2,\ y = 3$ FYI a correct $\frac{dy}{dx}$ is $\frac{3^x \ln 3 - 1.5y^2}{3xy - 6}$

Condone slips (e.g. sign and coefficient slips) when rearranging or simplifying under this method.

A1: Any correct numerical answer e.g. $\frac{dy}{dx} = \frac{9\ln 3 - \frac{27}{2}}{12}$ which must be partially simplified.

So, the denominator for instance must not be left as (18 – 6)