12 **(a)** It is given that $y = \frac{\ln 3x}{x^2}$ for $x > 0$.

Find $\frac{\mathrm{d}y}{\mathrm{d}x}$. Give your answer in the form $\frac{A + B\ln 3x}{x^3}$, where A and B are integers. [4]

(b) Hence find $\int \frac{\ln 3x}{x^3}\,\mathrm{d}x$. [4]

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