10 **(a)** Differentiate $x\ln x - 2x$ with respect to x. Simplify your answer. [2]

(b) A curve is such that $\frac{d^2y}{dx^2} = \left(\frac{x+1}{\sqrt{x}}\right)^2$. It is given that $\frac{dy}{dx} = \frac{e^2}{2} + 2e$ at the point $\left(e, \frac{e^3}{6} + e^2\right)$. Using your answer to **part (a)**, find the exact equation of the curve. [8]

Question 11 is printed on the next page.