



AM 201

$$\int_{\frac{1}{e}}^e x \ln^2 x dx = \frac{x^2}{2} \ln x \Big|_{\frac{1}{e}}^e - \int_{\frac{1}{e}}^e \frac{1}{x} \cdot \frac{x^2}{2} dx = \frac{e^2}{2} + \frac{1}{2e^2} - \frac{1}{2} \cdot \frac{x^2}{2} \Big|_{\frac{1}{e}}^e = \frac{e^2}{2} + \frac{1}{2e^2} - \frac{1}{4} \left(e^2 - \frac{1}{e^2} \right) =$$

$$= \frac{e^2}{4} + \frac{3}{4e^2}$$

b

$$\begin{cases} f(x) = \ln x \Rightarrow f'(x) = \frac{1}{x} \\ g'(x) = x \Rightarrow g(x) = \frac{x^2}{2} \end{cases}$$