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08	2a	(ii) Differentiate with respect to x : $x^2 \log_e x$	2
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Using the product rule:</p> $\frac{d}{dx} (x^2 \log_e x) = 2x \cdot \log_e x + \frac{1}{x} \cdot x^2$ $= 2x \cdot \log_e x + x$ </div> <div style="width: 50%;"> <p>As $y = u \cdot v$, then $\frac{dy}{dx} = \frac{du}{dx} \cdot v + \frac{dv}{dx} \cdot u$</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> $u = x^2$ $\frac{du}{dx} = 2x$ </div> <div style="text-align: center;"> $v = \log_e x$ $\frac{dv}{dx} = \frac{1}{x}$ </div> </div> </div> </div>			

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by the Board of Studies

Board of Studies: Notes from the Marking Centre

In better responses to this part, candidates either wrote down the product rule and explicitly identified the components or used setting out that mirrored the formula. The most common errors in this part were thinking that the derivative of $\log(x)$ is $\log(x)$ and not recognising that the product rule was needed.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/