07	2a	(i) Differentiate with respect to x: $\frac{2x}{e^x + 1}$	2

Using the quotient rule:

$$\frac{d}{dx}\left(\frac{2x}{e^x+1}\right) = \frac{(e^x+1).2 - 2x.e^x}{(e^x+1)^2}$$

$$= \frac{2e^x + 2 - 2x.e^x}{(e^x+1)^2}$$

As $y = \frac{u}{v}$, then $\frac{dy}{dx} = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$

$u = 2x$ then $\frac{du}{dx} = 2$ and $v = e^x + 1$ then $\frac{dv}{dx} = e^x$

* 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

(i) Common errors included reversing the terms in the numerator, the wrong sign, and claiming that the derivative of $2x$ is x or that of e^{x+1} is $x\,e^x$. Some candidates rewrote the quotient as a product but then had very limited success applying the product rule. Candidates are reminded to use brackets where appropriate.

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