06	2b	(i)	Find $\int 1 + e^{7x}\ dx$	2
		(ii)	Evaluate $\int\limits_0^3 \dfrac{8x}{1+x^2}\,dx$.	3

i. $\int 1 + e^{7x}\ dx = x + \dfrac{e^{7x}}{7} + c$

ii. $\int\limits_0^3 \dfrac{8x}{1+x^2}\,dx = 4\int\limits_0^3 \dfrac{2x}{1+x^2}\,dx$

$$= 4\left[\log_e(1+x^2)\right]_0^3$$
$$= 4\left[\log_e(1+3^2) - \log_e(1+0)\right]$$
$$= 4\left[\log_e 10 - \log_e 1\right]$$
$$= 4\left[\log_e 10 - 0\right]$$
$$= 4\ \log_e 10$$

* 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)   The most common error in this part was to differentiate one or both of the terms in the integrand, rather than to integrate them.

(ii)   The most common error in this part was not to recognise that the primitive was a logarithmic function. Poor responses included finding the primitive of each term in the numerator and denominator, differentiating the integrand, and incorrect algebraic rearrangements of the integrand. For those candidates who did recognise the primitive as a logarithmic function, common errors included: writing the primitive as $\frac{1}{4}\ln(1+x^2)$, writing the primitive as $4\ln((1+x)^2)$, and using logarithms to the base 10 instead of to the base e.

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