

12 (a) Use the substitution $u = e^x - 2$ to show that

$$\int \frac{7e^x - 8}{(e^x - 2)^2} dx = \int \frac{7u + 6}{u^2(u + 2)} du. \quad [3]$$

(b) Hence show that

$$\int_{\ln 4}^{\ln 6} \frac{7e^x - 8}{(e^x - 2)^2} dx = a + \ln b$$

where a and b are rational numbers to be determined.

[7]