8 **(a)** **(i)** Find $\int \sin\left(\frac{\phi+\pi}{3}\right)\mathrm{d}\phi$. [2]

(ii) Find $\int (5\sin^2\theta + 5\cos^2\theta)\,\mathrm{d}\theta$. [2]

(b) Show that $\int_1^{\mathrm{e}} \left(\left(1+\frac{1}{x}\right)^2 - 1\right)\mathrm{d}x = \frac{3\mathrm{e}-1}{\mathrm{e}}$. [4]

© UCLES 2021