10 **(a)** Find $\int (e^{x+1})^3 dx$. [2]

(b) **(i)** Differentiate, with respect to x, $y = x \sin 4x$. [2]

(ii) Hence show that $\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} 4x \cos 4x dx = \frac{1}{8} - \frac{\pi\sqrt{3}}{6}$. [4]