12 It is given that $y = x\mathrm{e}^{3x+2}$.

(a) Find $\dfrac{\mathrm{d}y}{\mathrm{d}x}$. [3]

(b) Hence find $\displaystyle\int x\mathrm{e}^{3x+2}\mathrm{d}x$. [4]

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