

Question 3 B Abdulrahman Rahman 2011863

(ii)

$$\int_1^2 3x e^{2x} dx = 3 \int_1^2 x e^{2x} dx$$

$$u = x$$

$$u' = e^{2x}$$

$$u' = 2$$

$$u = \frac{e^{2x}}{2}$$

$$3 \int_1^2 x e^{2x} dx = \frac{3x e^{2x}}{2} - \int \frac{e^{2x}}{2} dx$$

let ~~u~~ $u = e^{2x}$ $\therefore dx = \frac{1}{2} du$
 $\frac{du}{dx} = 2$

$$\frac{1}{4} \int e^u du = \frac{1}{4} [e^u] = \frac{e^u}{4} = \frac{e^{2x}}{4}$$

$$= \left[\frac{3x e^{2x}}{2} - \frac{e^{2x}}{4} \right]_1^2$$

$$= \frac{3x e^{2x}}{2} - \frac{3e^{2x}}{4}$$

$$\left(\frac{3(2)e^{2(2)}}{2} - \frac{3e^{2(2)}}{4} \right) - \left(\frac{3(1)e^{2(1)}}{2} - \frac{3e^{2(1)}}{4} \right)$$

$$= \left(\frac{6e^4}{2} - \frac{3e^4}{4} \right) - \left(\frac{3e^2}{2} - \frac{3e^2}{4} \right)$$

$$= \left(3e^4 - \frac{3e^4}{4} \right) - \left(\frac{3e^2}{2} - \frac{3e^2}{4} \right)$$

$$= 117.304045$$

$$= 117.304 \text{ (3.d.p.)}$$