

Answer on Question #45967 – Math - Integral Calculus

Find the integral with respect to

$x: f(x) = x e^{2x}$

Solution

$$\begin{aligned}\int x \cdot e^x \cdot e^{x+1} dx &= e \int x \cdot e^{2x} dx = e \int x \frac{d(e^{2x})}{2} = e \left(\frac{x e^{2x}}{2} - \frac{1}{2} \int e^{2x} dx \right) \\ &= \frac{e}{2} \left(x e^{2x} - \frac{e^{2x}}{2} + C \right) = \frac{e}{2} \left(x e^{2x} - \frac{e^{2x}}{2} \right) + C_0\end{aligned}$$

In this task the next rule (integration by parts) were used :

$$\int u \cdot dv = u \cdot v - \int v \cdot du$$