Questao 3

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$$\int x^5 e^{x^2} dx = \int x^4 \cdot x \cdot e^{x^2} dx = \int (x^2)^2 \cdot x \cdot e^{x^2} dx$$

$x^2 = v \rightarrow dv = 2x\,dx \;/\; \frac{dv}{2} = x\,dx$

$$\int v^2 \cdot e^v \cdot \frac{1}{2} dv = \frac{1}{2} \int v^2 \cdot e^v dv$$

LIATE

$a = v^2 \rightarrow da = 2v\,dv$

$dv = e^v dv \rightarrow v = e^v$

$$\frac{1}{2}\left(e^v \cdot v^2 - \int e^v \cdot 2v\,dv \right) =$$

$b(c-d) = bc - bd$

$$\frac{1}{2} e^v \cdot v^2 - \frac{1}{2} \cdot 2 \int e^v v\,dv =$$

$$\frac{1}{2} e^v \cdot v^2 - \int e^v v\,dv$$

Por partes novamente:

$t = v \rightarrow dt = 1\,dv$

$dw = e^v dv \rightarrow w = e^v$

$$\frac{1}{2} e^v \cdot v^2 - (v \cdot e^v - \int e^v \cdot dv)$$

$$\frac{1}{2} \cdot e^v \cdot v^2 - (v \cdot e^v - e^v)$$

$$\frac{1}{2} \cdot e^v \cdot v^2 - v e^v + e^v = e^v \left(\frac{v^2}{2} - v + 1 \right)$$

$$e^{x^2}\left(\frac{x^4}{2}-x^2+1\right)=\boxed{e^{x^2}\left(\frac{x^4}{2}-x^2+1\right)+C}$$