

Evaluate $\int_0^1 x^{22} \cdot e^{-x^{23}} dx$

1) Set $u = -x^{23}$

$$du = -23x^{22} dx$$

$$\text{so } \frac{du}{-23} = x^{22} dx$$

2) Rewrite as $\int \frac{-1}{23} \cdot e^u du$

3) Antidifferentiate this to get $\frac{-1}{23} e^u$

4) Replace u with $-x^{23}$ to get $\frac{-1}{23} e^{-x^{23}}$

5) Evaluate between 0 and 1 to get $\frac{-1}{23} (e^{-1} - e^0) = \frac{-1}{23} \cdot \left(\frac{1}{e} - 1 \right)$