

- a. Compute $\int x e^x dx$ using integration by parts with $u = x$ and $dv = e^x dx$.
- b. Let n be a positive integer. Apply one step of integration by parts to $\int x^n e^x dx$ to reduce the degree of the power of x .
- c. Use the recursive formula computed in the previous step to compute $\int x^n e^x dx$ for $n = 2, 3, 4$, then try to write down a formula that you expect to work in general *Hint: factorials may help*.
- d. Use induction to show that the formula you guessed in the previous case actually works.