To be handed in no later than 10:30 a.m., Friday, June 25

Let \( I_n = \int_0^1 x^n e^{x-1} \, dx \).

1. Show that \( I_1 = \frac{1}{e} \approx 0.36787944117144 \).

2. Integrate by parts to obtain the formula:

\[
I_n = 1 - n I_{n-1} \quad \text{for } n = 2, 3, 4, \ldots
\]

3. Use the recipe in 2 to compute \( I_2, I_3, \ldots, I_{50} \). (Do these calculations numerically; do not do them symbolically.)

4. Do have any intelligent comments about all of this?