1. Compute the following integral using integration by substitution:

\[ \int \frac{1}{3} x \cos\left(x^2 + \frac{\pi}{4}\right) dx \]

2. Compute the following integral using integration by parts:

\[ \int x^5 \ln(6x) dx \]

3. Solve the following separable differential equation:

\[ e^x y' = 2y' + e^{x+y}, \quad y(0) = 0 \]