Integration by Parts: Evaluate the following integrals using integration by parts.

1. \( \int x^2 \ln(x) \, dx \)

2. \( \int x^2 \sin(3x) \, dx \).
Evaluate the following integrals using any method from class.

3. \( \int_0^1 e^{x^2+1} \, dx \)

4. \( \int x^3 e^{-x^2/2} \, dx \)