

**Problem 1.** Does  $\int_0^\infty xe^{-x^2} dx$  converge? If so, calculate it.

**Problem 2.** Does  $\int_{-\infty}^\infty xe^{-x^2} dx$  converge? If so, calculate it.

**Problem 3.** Does  $\int_0^\infty e^{-x^2} dx$  converge? **Hint:** You will not be able to find an antiderivative of  $e^{-x^2}$ . Instead, try using the comparison test.