1. Compute the integral 
\[ \int_{0}^{\infty} xe^{-x} \, dx. \]
2. Decide whether the following improper integral converges or diverges and justify your answer. If you use the comparison theorem, make sure that your comparison is valid

$$\int_1^\infty \frac{u^4}{(u^2 + 1)^2} du.$$ 

3. **Bonus:** Draw a picture of your spirit animal.