4. [11 points]
   a. [6 points] Determine whether the following series converges absolutely, converges conditionally, or diverges, and give a complete argument justifying your answer.
   \[ \sum_{n=1}^{\infty} (-1)^n \sin \left( \frac{1}{n} \right) \]
   \[ \text{Converges absolutely} \quad \text{Converges conditionally} \quad \text{Diverges} \]
   Justification:

   b. [5 points] Compute the value of the following improper integral. \textbf{Show all your work using correct notation.} Evaluation of integrals must be done \textbf{without a calculator}.
   \[ \int_{0}^{\infty} \frac{e^x}{(1 + e^x)^2} \, dx \]