

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.

$$\sum_{n=1}^{\infty} (-1)^n \sin\left(\frac{1}{n}\right)$$

Converges absolutely

Converges conditionally

Diverges

Justification:

- b. [5 points] Compute the value of the following improper integral. **Show all your work using correct notation.** Evaluation of integrals must be done **without a calculator.**

$$\int_0^{\infty} \frac{e^x}{(1+e^x)^2} dx$$