

8. [12 points] Determine if the following integrals converge or diverge. Justify your answer. If you use the comparison test, be sure to show all your work.

a. [3 points]  $\int_1^{\infty} \frac{1}{x + e^x} dx.$

b. [4 points]  $\int_1^e \frac{1}{x(\ln x)^2} dx.$

c. [5 points]  $\int_{2\pi}^{\infty} \frac{x \cos^2 x + 1}{x^3} dx.$