

Homework 13

1. Determine whether the improper integral diverges or converges. Evaluate the integral if it converges.

$$\int_0^{\infty} x^2 e^{-x} dx$$

2. Determine whether the improper integral diverges or converges. Evaluate the integral if it converges.

$$\int_0^{\infty} \cos \pi x dx$$

3. Determine whether the following integral converges or diverges.(Using the limit comparison test to solve the problem.)

$$\int_1^{\infty} \frac{x^2 + 3x}{\sqrt{x^5 + 1}} dx$$