

1. Show that each improper integral converges. Then find a definite integral that approximates the improper integral within 10^{-10} of its actual value.

(a) $\int_1^{\infty} \frac{1}{e^x + 2} dx$

(b) $\int_2^{\infty} \frac{2}{2x^4 - 1} dx$

2. Show that $\int_2^{\infty} \frac{1}{e^x + 3x^2} dx$ converges, and approximate its value accurate within 0.0001.

3. Let $I = \int_0^1 \frac{1}{x^p} dx$. For what values of p does I converge? diverge?