

Improper Integrals

State the definition of an improper integral of type 1.

State the definition of an improper integral of type 2.

What does it mean for an improper integral to be convergent?

Fully state the Comparison Theorem for improper integrals.

Evaluate the following:

1. $\int_1^{\infty} \frac{1}{(2x+1)^3} dx$

2. $\int_{-\infty}^0 2^r dr$

3. $\int_{-\infty}^{\infty} (y^3 - 3y^2) dy$

4. $\int_0^3 \frac{dx}{x-1}$