

Lesson 6.9: Improper Integrals

An integral is called _____ if:

- 1.
- 2.

Examples: Use the conditions above to explain why each of the following integrals is improper.

1. $\int_1^{\infty} \frac{1}{x} dx$

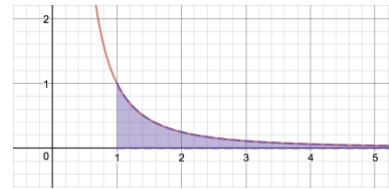
3. $\int_{-\infty}^{\infty} \frac{1}{x^2+1} dx$

2. $\int_1^5 \frac{1}{\sqrt{x-1}} dx$

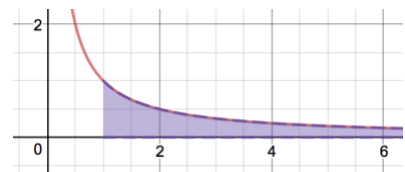
4. $\int_{-2}^2 \frac{1}{(x+1)^2} dx$

Examples: Evaluate the following improper integrals. Identify those which **diverge**.

1. $\int_1^{\infty} \frac{1}{x^2} dx$



2. $\int_1^{\infty} \frac{1}{x} dx$



3. $\int_0^{\infty} \cos(x) dx$

4. $\int_1^{\infty} x e^{-x} dx$

5. $\int_{-1}^2 \frac{dx}{x^3}$