Improper Integrals, One Last Time

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Announcements

1. Homework in MyOpenMath.
2. Exam corrections

A Comparison Theorem

Let's say I want to know if

$$\int\limits_{1}^{\infty} \frac{1}{x^2 + x} \, dx$$

converges or diverges. Can we say anything about convergence without actually evaluating this integral?

A Comparison Theorem

Suppose that $0 \leq f(x) \leq g(x)$ for all $x \in (a, \infty)$. Then

- If $\int\limits_{a}^{\infty} f(x)\, dx$ _____, we can say that

$$\int\limits_{a}^{\infty} g(x)\, dx$$

- If $\int\limits_{a}^{\infty} g(x)\, dx$ _____, we can say that

$$\int\limits_{a}^{\infty} f(x)\, dx$$

Example

Does the following integral converge or diverge?

$$\int\limits_{1}^{\infty} \frac{1}{x^3 + x^2 + x + 1} \, dx$$

Example

Does the following integral converge or diverge?

$$\int\limits_{1}^{\infty} \frac{1+t}{1+t^2} \, dt$$