

Study guide for quiz 01

Quiz problems include both the lecture contents and homework problems.

1. Section 8.8:

Memorize the definitions of type I and type II improper integrals and study how to verify convergence/divergence of improper integrals from these definitions.

2. Section 8.8:

Study the convergence/divergence of the improper integrals $\int_a^\infty \frac{1}{x^p} dx$ ($a > 0$), $\int_0^a \frac{1}{x^p} dx$, $\int_c^{c+a} \frac{1}{(x-c)^p} dx$, and $\int_{c-a}^c \frac{1}{|x-c|^p} dx$ for $p > 1$, $p = 1$ and $0 < p < 1$, respectively by direct computation. Then memorize the results. Plotting the graph of $f(x) = \frac{1}{x^p}$ for various p 's as in page 11 of lecture 01 would likely help you memorize the results.

3. Section 8.8: Study the comparison Theorems (Theorem 2, Theorem 3) used to decide convergence/divergence of improper integrals. Sample problems: section 8.8, problems 35-64.

4. Section 8.8: Study how to determine convergence/divergence of an improper integral with multiple 'improper' parts, such as the domain contains both $x \rightarrow \pm\infty$, and/or points of discontinuity within the domain.