M 384: Assignment 3

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Exercises 6.3.2 — Problem 1

Problem. For which values of a and b does the improper integral $\int_0^{1/2} x^a |\log x|^b dx$ exist?

Proof.

□

Exercises 7.2.4 — Problem 1

Problem. Give and example of two convergent series $\sum_{k=1}^{\infty} x_k$ and $\sum_{k=1}^{\infty} y_k$ such that $\sum_{k=1}^{\infty} x_k y_k$ diverges. Can this happen if one of the series is absolutely convergent?

Proof.

□

Exercises 7.2.4 — Problem 2

Problem. State a contrapositive for of the comparison test that can be used to show divergence of a series.

Proof.

□

Exercises 7.2.4 — Problem 4

Problem. Prove the ratio test. What does this tell you if $\lim_{n\to\infty} |x_{n+1}/x_n|$ exists?

Proof.

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