Mathematical Analysis Exam 3

May 1, 2025. As always, and actually, on any exam from any professor, if you get bogged down on a problem, move on and come back later.

Chapter 9 — Derivatives

1. Limits (4 pts)

Use the definition of the limit — a δ–ϵ proof starting with the limits poem — to show that:

$$\lim_{x \to 1} x^{1/3} = 1$$

HINT: After writing down what you are trying to prove, multiply $x^{1/3} - 1$ by $\frac{x^{2/3}+x^{1/3}+1}{x^{2/3}+x^{1/3}+1}$ and simplify.

Chapter 10 — Differentiation

Chapter 11 — Significance of the Derivative

Chapter 12 — Inverse Functions

Chapter 13 — Integrals

Chapter 14 — The Fundamental Theorem of Calculus

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