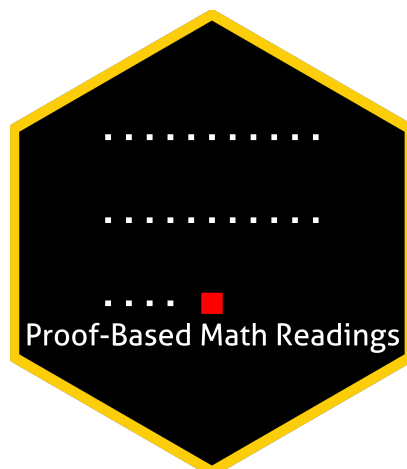# Proof-Based Math Readings Session: Measure Theory*

Zeki Akyol

Department of Economics
University of California, Santa Cruz
Click here for the most recent version

Version: 01 February 2026, 11:45 AM

Table of contents

---

0 Motivation

- *Proof-Based Math Readings* is a free, independent online reading group where we study the mathematics required for economics master's and PhD programs through an intuitive approach. Active since May 2023.
- This session of the reading group is on *Measure Theory*.

1 Prerequisites and Format

- Proof Techniques, Real Analysis, and Topology resources below.
- Please use the 🔗 Application Form to join our reading group; you will receive a response within a week.
- This session takes 12 weeks. We do not have face-to-face/online meetings due to the size of the group.
- Members read the main book and discuss the topics/exercises in the Proof-Based Math Readings Discord 🎮.

2 Resources [All are open-access]

2.1 Main Book and Main Book's Playlist

Measure, Integration & Real Analysis - Sheldon Axler (2025, Errata-free version) is our main book for this session because it is well-written, well-structured, and open-access.

- 📖 Measure, Integration & Real Analysis - Sheldon Axler (2025, Errata-free version)
- ▶ Measure, Integration & Real Analysis - Sheldon Axler (202X, Playlist) → will be added after the 2nd edition.

2.2 Supplementary

2.2.1 Measure Theory

- ▶ Measure Theory - The Bright Side of Mathematics (2025)
- ▶ Measure Theory - Indrava Roy (2020)
- ▶ A horizontal integral?! Introduction to Lebesgue Integration - vcubingx (2020)
- ▶ The Lebesgue Integral - BBC (1975)

2.2.2 Proof Techniques

- 📖 Book of Proof - Richard Hammack (3.4 Edition, 2025)
- ▶ Book of Proof - Richard Hammack (3.4 Edition, 2025, Playlist by Jeremy Teitelbaum)
- ▶ Book of Proof - Richard Hammack (3.4 Edition, 2025, Playlist by Michael Penn)

2.2.3 Real Analysis

- 📖 Measure, Integration & Real Analysis - Sheldon Axler (2025, Supplement)
- 📖 Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.3, 2026)
- ▶ Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.3, 2026, Playlist by Casey Rodriguez)
- ▶ Introduction To Metric Spaces - Paige Bright (2023)

3　Reading Schedule

- **MIRA** is the abbreviation of **Measure, Integration & Real Analysis - Sheldon Axler (2025)**.

📘 MIRA, Chapter 1: Riemann Integration　　　　　　　　Week 01 📅

1A Review: Riemann Integral

1B Riemann Integral Is Not Good Enough

📘 MIRA, Chapter 2: Measures　　　　　　　　Week 02-03-04-05 📅

2A Outer Measure on $\mathbf{R}$

2B Measurable Spaces and Functions

2C Measures and Their Properties

2D Lebesgue Measure

2E Convergence of Measurable Functions

📘 MIRA, Chapter 3: Integration　　　　　　　　Week 06-07-08 📅

3A Integration with Respect to a Measure

3B Limits of Integrals & Integrals of Limits

📘 MIRA, Chapter 4: Differentiation　　　　　　　　Week 09 📅

4A Hardy–Littlewood Maximal Function

4B Derivatives of Integrals

📘 MIRA, Chapter 5: Product Measures　　　　　　　　Week 10-11-12 📅

5A Products of Measure Spaces

5B Iterated Integrals

5C Lebesgue Integration on $\mathbf{R}^{\mathrm{n}}$

4　Further Readings (Optional)

Our Measure Theoretic Probability syllabus at ⭕ github.com/zekiakyol/proof-based-math-readings