1 Introduction

**Mathematics
and Statistics**

$$\int_M d\omega = \int_{\partial M} \omega$$

Mathematics 3A03
Real Analysis I

Instructor: David Earn

Lecture 1
Introduction
Monday 6 January 2025

Where to find course information

- The course web site: `http://ms.mcmaster.ca/earn/3A03`

- Click on Course syllabus to view the basic course information.
    - *You are expected to read and pay attention to every word of the syllabus.*
    - *Note that some items in the syllabus are tentative and might be updated.*

- Let's have a look now. . .

What you are assumed to know

Chapters 1–5 of Bartle and Sherbert (BS), *Introduction to Real Analysis*

- The Real Numbers, $\mathbb{R}$ (BS Chapter 2)
- Sequences and Series (BS Chapter 3)
- Limits of functions (BS Chapter 4)
- Continuous functions (BS Chapter 5)

What you are assumed to know

A few polls to trigger your memory:

- The property that characterizes $\mathbb{R}$ in comparison with $\mathbb{Q}$
  - Please log in (right now) to this web site: `https://www.childsmath.ca/childsa/forms/main_login.php`
  - Click on Math 3A03.
  - Click on Take Class Poll.
  - After selecting an answer, click the `Submit` button.
  - Everybody done?
  - Let's Deactivate the poll and View Results

- Sequence limit order

- Monotone convergence

- Intermediate and extreme values

What we will cover in this course

Primary sources

- **_Second half of Math 3IA3 textbook:_**
  Bartle and Sherbert (BS), *Introduction to Real Analysis*

- **_Online textbook:_**
  Thomson, Bruckner and Bruckner (TBB), *Elementary Real Analysis*

- **_Optional book:_**
  Michael Spivak, "Calculus" (4th ed., 2008)
  - This book is not sufficiently advanced for this course, but the exposition of elementary analysis is very nice.
  - You don't need this book, but it is a great read, and if you read it you'll see some of the things that inspire some aspects of my presentation style.

What we will cover in this course

Primary topics

- **_Differentiation_**
  (BS Chapter 6) (TBB Chapter 7)

- **_Integration_**
  (BS Chapter 7) (TBB Chapter 8)

- **_Topology of the real line_**
  (BS Chapter 11) (TBB Chapter 4)

- **_Sequences and series of functions_**
  (BS Chapters 8 and 9) (TBB Chapter 9)

- **_Metric spaces_**
  (TBB Chapter 13)

Survey

Please do the Survey poll on childsmath.

In addition to doing the survey, please e-mail me (now or at any point in the term) with any preferences or suggestions you have about how to run the course.

Questions

Questions?