

## Mathematics Review for the Field of Economics

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Class room: Uris Hall 262

Office hour/location: After class.

### Overview

The goal of the review is to prepare students for the first-year economics core courses: ECON 6090, ECON 6130, ECON 6170 and ECON 6190. We will cover mathematical concepts and techniques that will enable you to focus on the “meat” of these core courses. With this objective in mind, having established some foundational knowledge, the review will lean towards covering materials with practicality in mind rather than mathematical rigour and/or learning proofs. In addition to difference in coverage of topics, this practical “mentality” distinguishes this class from ECON 6170.

Please also note that Math Review is a review course: the amount of material covered is large, and if you are not already somewhat familiar with it and/or you are struggling to follow the material, please come talk to me.

**Should I attend?** Yes! This goes without saying for those who do not feel comfortable with the materials in the syllabus but even for those who feel that they are, the course should be a good refresher. Most importantly, attending the class will help you form study groups (and friends!) which is critical in ensuring that you succeed in your first year. Lastly, the class is directly relevant for an assessment of your prior mathematical knowledge that will be held in class during the first week of ECON 6170. I will emphasize that this assessment will *not* count towards your grades in any class.

### Schedule

The course runs every weekday for two weeks from 12th to 23rd of August 2024. **Classes will be held from 9am to 12.15pm** in Uris Hall 265 (with a 15 minute break in the middle), **except on 22nd of August**, when the class will run from **12.30pm to 3.45pm** so that you can attend the graduate school orientation.

### References

The material is self-contained. If you would like more references, you may consider the following textbooks: *A First Course in Optimization Theory* by Raghu Sundaram; *Mathematics for Economists* by Carl P. Simon and Lawrence Blume; *Further Mathematics for Economic Analysis* by Knut Sydsaeter, Peter Hammond, Atle Seierstad, and Arne Strom; *Probability and Statistics for Economists*, Bruce Hansen.

### Expectations, Course Policies and Resources

This course aims to collectively create a welcoming, supportive and tolerant environment for all students and respects the various forms of diversity that they bring. To this end, I ask that we be respectful of each other, actively listen, participate, ask relevant questions, and give balanced, specific, and constructive feedback to each other.

## Course Outline

A tentative course outline is the following. We will keep the schedule flexible, so topics may be added and removed from this list. The topics marked with \* will only be covered if we have time.

### 1. Foundational concepts

- (a) Preliminaries
- (b) Structures on spaces
- (c) Linear algebra
- (d) Calculus: Differentiation
- (e) Calculus: (Riemann) Integration

### 2. Optimisation

- (a) Static optimisation
- (b) Dynamic optimisation

### 3. Probability and Statistics

- (a) Probability and random variables
- (b) Common distributions
- (c) Stochastic dominance