Syllabus

I Term. One Variable Calculus

Lecturer Tornike Kadeishvili
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Teaching Assistant Zaza Tevdoradze

Reading:

[SB] C. P. Simon, L. Blume. "Mathematics for Economists". W.W. Norton. 1994.

[CW] A.C. Chiang, K. Wainwright. "Fundamental Methods of Mathematical Economics". McGraw-Hill. 2005

[LN] Lecture Notes.

Grades: Home-works - 10%, midterm - 40%, final exam - 50%.

Notes on homework: Problems sets will be assigned every week and will be due next week before the class starts.

Week 1. Foundations

Reading 2.1-2.2 [SB]

Introduction: Mathematical models in economics.

Vocabulary of functions: Function, graph, domain, range, image, preimage.

Polynomials, rational functions.

Increasing and decreasing functions, minima and maxima.

Linear functions, slope and intercepts.

Week 2. Derivatives

Reading 2.3-2.7 [SB]

Derivative, rules for computing derivatives.

Differentiability and continuity, higher order derivatives, approximation by differential, Taylor formula.

Week 3. Using derivatives

Reading 3.1-3.5 [SB]

Using derivative for graphing, second derivative and convexity.
Graphing rational functions, maxima and minima.

Week 4. Applications to Economics

Reading 3.6 [SB]

Production function, cost function, revenue and profit, demand and elasticity.

Week 5. Chain Rule

Reading 4.1-4.2 [SB]

Composition, injections, surjections, bijections, chain rule, inverse function, derivative of inverse function.

Week 6. Exponents and logarithms

Reading 5.1-5.6 [SB]

Exponential and logarithmic functions, number e, derivatives of exp and log.

Economical applications: Present value, optimal holding time, logarithmic derivative.

Week 7. Integrals
Reading A4.1-A4.3 [SB]

Indefinite integra, definite integral, fundamental theorem of calculus, applications.