

Math Workshop – 2026

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Online Lecture Time: TBD

In-person Lecture Time: Thursday 11:30am – 1:00pm and Friday 10am – 12:30pm

In-person Lecture Location: TBD

Course Description

The Math Workshop is designed to ensure that new students have the mathematical tools needed for Master's and PhD level courses. It covers topics such as single and multi-variable calculus; linear algebra; unconstrained, constrained and dynamic optimization. No registration is required but all incoming graduate students are expected to attend.

Some Useful Textbooks (NOT REQUIRED)

- Matrix Theory and Linear Algebra by Peter Selinger. <https://www.mathstat.dal.ca/~selinger/linear-algebra/downloads/LinearAlgebra.pdf>
- Stewarts' Calculus. <https://www.cengage.ca/c/calculus-44-8th-edition-8e-stewart/9781285740621/?filterBy=Higher-Education>
- John Rumsey's ECON3700 notes. Attached in the content section.

Some Useful Online Resources

- Khan Academy. <https://www.khanacademy.org>
- Professor Leonard. <https://www.youtube.com/professorleonard>
- MIT OpenCourseWare. <https://ocw.mit.edu>
- Economics in Many Lessons. <https://www.youtube.com/Economics+in+Many+Lessons>

Schedule (Tentative)

The first two weeks will consist of asynchronous videos. The middle two weeks will consist of synchronous live sessions. The last two weeks will consist of in-person lectures. There will be three tests, administered at the end of each second week. These tests will be graded with the results returned to you. The grades will also be shared with the graduate coordinator. These

results will not appear on your academic record and are only used as a diagnostic. You are highly encouraged to write all three tests.

Weeks	Topics
Week 1 (Beginning August 10 th) Mode of Delivery: Asynchronous Video	Functions (notation, domain/codomain and range, one/multi variable function, exponents and logarithms, and slopes)
Week 2 (Beginning August 17 th) Mode of Delivery: Asynchronous Video	Derivatives (definition of derivatives, rules of differentiation, partial derivatives, gradients, and possibly convexity/concavity) A test will be administered this week.
Week 3 (Beginning August 24 th) Mode of Delivery: Synchronous Online Lecture	Unconstrained Optimization (First and Second order conditions, necessary conditions for maximum and minimum, and some economic applications)
Week 4 (Beginning August 31 st) Mode of Delivery: Synchronous Online Lecture	Constrained Optimization (equality constraints, Lagrangian, utility maximization and cost minimization, possibly the Kuhn-Tucker theorem) A test will be administered this week.
Week 5 (Beginning September 7 th) Mode of Delivery: In-person Lecture	Linear Algebra (vectors & matrices, systems matrix operations, matrix inverses, the determinant, rank, and linear independence)
Week 6 (Beginning September 14 th) Mode of Delivery: In-person Lecture	Linear Algebra Cont. (eigenvalues and eigenvectors, quadratic forms, positive and negative definiteness, Hessian matrices, and applications) A test will be administered this week.