

REQUIRED CONTENT OF ECON 1078: MATH TOOLS FOR ECONOMISTS 1

Econ 1078: Math Tools for Economists 1 is a “core course” in the sense that, by teaching fundamental principles, it forms a pre-requisite for many courses. It is important that instructors teaching the courses for which this course is the pre-requisite know that students have learnt the fundamental principles, so that these more advanced courses can build on this knowledge without reteaching it. Therefore it is appropriate that this course has “required content”. “Required content” is a list of topics which it is necessary that the course cover. However, it is not an exhaustive list: the instructor is free to add additional topics provided he/she covers the required content.

“Required content” is required to be taught by all instructors of these courses, whether tenure-track, instructors or GPTIs

SECTION A: Introductory Topics

This section presents material which is vital for understanding the material covered later in the course, and which is to some extent used in nearly every economics course.

1. Basic “college” algebra: including real numbers, integer powers, basic algebraic identities and expressions, factoring, fractions, rational exponents, inequalities, intervals and absolute values.

Although we often assume that all students already understand this material from high school, it has become clear that many of them do not and this section should not be rushed or done as just a review.

2. Equations: including how to solve simple linear equations (with parameters), systems of two linear equations, quadratic equations and other non-linear equations.
3. Set Theory and an introduction to logic (including necessary and sufficient conditions).
4. Summation notation and working with summations (vital for Econ 3818).

SECTION B: Functions

Virtually every economic model involves a function of some type, so a thorough understanding of this concept is vital for studying economics at any level. Considerable attention should be given to graphing each function type.

1. The basics: Includes the definition of a function, notation, domain and range, and graphs of functions.
2. Linear functions: Includes slopes, the general equation for a straight line, slope-intercept form, graphing, linear inequalities, and linear models.
3. Quadratic functions and how they can apply to economic models (e.g. a simple monopoly model).
4. Polynomials: Includes factoring polynomials, division, and rational functions (these skills are often employed in Econ 3070).
5. Exponential and logarithmic functions. These should be covered carefully as they are used extensively in intermediate economics courses (e.g. when presenting positive, monotonic transformations).
6. Important function properties and techniques: Includes products and quotients, shifting functions, and composite functions.