

*Montgomery College - Department of Mathematics
Takoma Park/Silver Spring Campus*

**MA115A – Mathematical Ideas
3 Semester Hours**

Description Intended primarily for students who need only one mathematics foundation course with an emphasis on quantitative reasoning. This course includes support content from intermediate algebra as needed to study major topics selected from (but not limited to) graph theory, voting and apportionment, geometry, growth and symmetry, number theory, and descriptive statistics. Emphasis is on contemporary applications to real-life problems. Credit may not be earned in both MA 115A and MA 110 or MA 115. Not intended for students with a C or better in MA 100 or 100D.

MA115A meets 5 hours each week.

Prerequisites Appropriate score on the mathematics assessment test, grade of A in MA 091/091A, or consent of department.

Assessment levels: EN 101/101A, RD 120.

Topics The textbook is divided into four parts, each studying problems related to a common theme. Each instructor chooses which three of these four topics to cover. These topics are as follows:

I. The Mathematics of Social Choice

1. Voting systems
2. Fair division of resources

II. Management Sciences

1. Networks
2. Digraphs
3. The traveling salesman problem

III. Growth and Symmetry

1. Linear and exponential growth models in nature
2. Symmetry
3. Fractals.

IV. Statistics

1. Descriptive statistics
2. Probability
3. Normal distribution.

In addition, support content from these topics in intermediate algebra will also be included.

I. Lines

1. Sketching lines
2. Slope
3. Solving linear equations
4. Using lines to model data

II. Functions

1. Overview
2. Linear functions
3. Function notation

III. Exponential functions

1. Properties of exponents
2. Rational exponents
3. Graphs
4. Solving exponential equations
5. Modeling with exponential functions

IV. Logarithmic functions

1. Inverse functions
2. Logarithms
3. Important bases: e and 10
4. The power property

V. Quadratic functions

1. Solving quadratics by various methods
 - a. Factoring
 - b. Taking square roots
 - c. Quadratic formula
2. Graphing quadratic functions
3. Modeling with quadratic functions

VI. Rational functions

1. Domain
2. Simplifying
3. Solving rational equations
4. Modeling with rational functions

VII. Radical functions

1. Simplifying radical expressions
2. Radical equations

VIII. Graphing calculators (Note: these topics are taught throughout the course.)

1. Evaluation of functions
2. Finding intercepts
3. Mechanics: screen contrast, batteries, and common error messages.
4. Order of operations
5. Menus: WINDOW, Y=, ZOOM, CALC, MATH and TABLE.

Text

*Excursions in Modern Mathematics, 6th Edition by Tannenbaum.
Prentice-Hall Publishing Company.*