

*Montgomery College - Department of Mathematics
Rockville Campus*

**MA101 - Intermediate Algebra for Liberal Arts
3 Semester Hours**

Description Development of Algebraic and problem-solving skills and concepts intended to prepare students for a mathematics foundation course. Topics include linear, quadratic, and exponential equations, functions and their applications, modeling and data analysis. This course does not satisfy the prerequisite for MA 130, MA 160, or MA 180. Not intended for students who have a grade of C or better in MA 100, MA 100D, MA 103, or their equivalent.

MA101 meets 3 hours each week.

Prerequisites A grade of C or better in MA 091, MA 091A, or MA 091D; or appropriate score on the mathematics assessment test; or consent of department.

Assessment level: RD120 or equivalent.

Topics

- 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
 5. Using logarithms to solve exponential equations
- V. Polynomial functions
 1. Expanding and factoring polynomials
 2. Solving quadratics by various methods
 - a. Factoring

- b. Square root method
 - c. Quadratic formula
 - 3. Complex numbers as solutions to quadratics
 - 4. Finding intercepts and the vertex of parabolas
 - 5. Graphing parabolas
 - 6. Modeling with quadratic functions
- VI. Modeling Data and Analysis
 - 1. Create and analyze scatter plots from data
- VII. Graphing Calculator
 - 1. Enter, Evaluate functions
 - 2. Find intercepts
 - 3. Find the intersection of two graphs

Additional Topics

The following topics will be selected by the Math Department of each Campus based on relevance.

- VIII. Rational functions and equations
 - 1. Domain of rational functions
 - 2. Simplify rational expressions
 - 3. Solve rational equations
- IX. Proportions – Direct and Inverse
- X. Systems of equations
 - 1. Solve linear and non-linear systems of equations
- XI. Modeling
 - 1. Perform linear, quadratic, and exponential modeling on the graphing calculator through the use of the regression feature.
- XII. Geometry
 - 1. Area and volume of common figures
- XIII. Set Theory
 - 1. Definition
 - 2. Apply and interpret set notation
 - 3. Perform set operations
- XIV. Quantitative Literacy
 - 1. Interpolate data
 - 2. Significant digits
 - 3. Distinguish between accuracy and precision
- XV. Symbolic Logic
 - 1. Translate statements in to symbolic form
 - 2. Construct truth tables
 - 3. The converse, inverse and contrapositive of a statement.
 - 4. DeMorgan's Laws
- XVI. Series
 - 1. Identify arithmetic and geometric series
 - 2. Find the sum of arithmetic and geometric series

3. Make estimates and predictions using arithmetic and geometric series
- XVII. Additional work with logarithms
1. Apply additional properties of logarithms to simplify and evaluate logarithmic expressions and logarithmic equations.
 2. Graph logarithmic functions of the form $f(x) = \log_b x$
- XVIII. Linear inequalities
1. Graph linear inequalities in two variables
 2. Graph compound inequalities in one variable

Text

INTERMEDIATE ALGEBRA, Functions and Authentic Applications. 3rd edition, Jay Lehmann, Prentice Hall, 2007.