

*Montgomery College - Department of Mathematics
Rockville Campus*

**MA130 – Elements of Mathematics I : Number Systems
4 Semester Hours**

Description This course covers mathematical reasoning, problem solving, and sets. Topics include concepts and processes involving numeration systems, whole numbers, number theory, integers, and rational numbers. Intended for elementary education majors, this course is also suitable for parents of school-age children.

MA130 meets 4 hours each week.

Prerequisites A grade of C or better in MA 103, appropriate score on mathematics assessment test, or consent of department.

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

- Topics**
- I. Mathematical Reasoning
 - 1. Recognizing and using inductive and deductive reasoning
 - 2. Finding and generalizing patterns
 - 3. Using different strategies to solve problems
 - II. Sets
 - 1. Interpreting set notation and applying set operations
 - 2. Constructing and interpreting Venn diagrams
 - III. Whole Numbers
 - 1. Comparing and contrasting different numeration systems
 - 2. Classifying applications of each operation
 - 3. Properties of whole number operations
 - 4. Using pictorial models for arithmetic algorithms
 - 5. Alternate algorithms for each operation
 - 6. Estimation and mental computation
 - 7. Place value and arithmetic in a different base
 - IV. Number Theory
 - 1. Proving or disproving conjectures about factors and multiples
 - 2. Divisibility tests
 - 3. Methods to find prime factorizations, GCF, and

LCM

- V. Integers
 1. Pictorial models to represent integers and integer addition and subtraction.
 2. Writing and solving application problems that illustrate all four operations
 3. Developing and explaining rules for integer arithmetic
 4. Properties of integer operations
- VI. Rational Numbers as Fractions
 1. Common meanings of fractions
 2. Pictorial models to represent fractions, equivalent fractions, and arithmetic with fractions
 3. Developing and explaining procedures for arithmetic with fractions
 4. Properties of rational operations
 5. Procedures for mental computation and estimation
- VII. Decimals
 1. Pictorial models to represent decimals and decimal arithmetic.
 2. Developing and explaining procedures for decimal arithmetic.
 3. Procedures for mental computation and estimation.

Text

Mathematics for Elementary Teachers: An Interactive Approach, for Grades K-8 (3rd Edition), Sonnabend, Brooks Cole, 2004.