

**Mathematics Department**  
**Brooklyn College, City University of New York**  
**Math 1401 (Elementary Mathematics from an Advanced Standpoint)**  
**4 hours lecture; 4 credits**

Textbook:

- A Problem Solving Approach to Mathematics for Elementary School Teachers, 12th Edition, by Billstein, Libeskind and Lott

1. Problem Solving

- Introduction to problem solving strategies
- Inductive and deductive reasoning

2. Sets

- Brief review of set language and operations, including Cartesian products

3. Number Systems

- Written numerals in base- $n$ ; development of multiple algorithms for arithmetic operations
- Theory of the standard algorithms for arithmetic
- Integers; properties of integer arithmetic; arithmetic operations with integers
- Integer properties; prime and composite numbers; divisibility; Euclidean algorithm
- Rational numbers; arithmetic operations with rationals. Decimal fractions; arithmetic operations

4. Geometry

- Concepts of plane and space geometry: lines, angles, polygons, parallelism, polyhedra
- Quantitative properties of figures: angles, length, area, volume
- Transformational geometry: translations, rotations, reflections, and dilations. Symmetry

5. Probability and Statistics

- Probability: Sample spaces; model building; applications; empirical probabilities; probability of events drawn from sample spaces with equally likely outcomes
- Statistics: measures of central tendency