

**University at Buffalo**  
**GIFTED MATH PROGRAM**

**GMP I Curriculum**

Textbooks: GMP I – Operational Systems, Logic, Number Theory, Probability and Statistics;  
Mathematics Department of Phillips Exeter Academy, Mathematics 1

**SETS, SUBSETS, AND OPERATIONS WITH SETS**

- SETS AND SUBSETS: Equality, Membership, Singleton sets, The empty set, Venn diagrams, Subsets, Power sets, Number of elements of a power set, Number of  $k$ -element subsets of a set with  $m$  elements (Pascal's formula)
- OPERATIONS WITH SETS: Intersection, Union, Difference, Symmetric difference

**MAPPINGS**

- MAPPINGS: Mappings from A to B, Mappings from A onto B, One-to-one mappings, Permutations on a set, The image of an element under a mapping, Composition of mappings, Arithmetic mappings
- MAGNIFICATION OF MAPPINGS ON LENGTHS: "Stretchers," "Shrinkers," Composites of stretchers and shrinkers, Addition of lengths, Comparison of lengths
- APPLICATIONS OF MAGNIFICATION MAPPINGS: Photography, Map making, Scale drawing, Solution of problems on weight, time, and money
- PERCENT MAPPINGS

**MATHEMATICS 1 (Phillips Exeter Curriculum)**

COORDINATE GEOMETRY: Connecting graphs to tables, equations, and contexts; Slope as a rate, intercepts, graphs of lines

ALGEBRA MECHANICS: Operations on fractions, Simplifying linear expressions, distributive property, Solving linear and rational equations and inequalities, percent

GEOMETRY: congruence angles, congruent triangle theorems, parallel lines as related to angles

**OPERATIONAL SYSTEMS**

- MODULAR ARITHMETIC: Addition, Subtraction, Multiplication, Division, Multi-Operational
- APPLICATIONS OF MODULAR ARITHMETIC

**INTRODUCTORY LOGIC**

- THE FORMAL LANGUAGE: Introduction, Negation, Conjunction, Disjunction, Sentences and Well-formed Formulas, Truth tables, Implication, Equivalence

**NUMBER THEORY**

- MULTIPLES AND DIVISORS OF NATURAL NUMBERS: Primes, Composites, Relatively prime, Unique factorization, Euler Phi Function (if time allows)
- LEAST COMMON MULTIPLES AND GREATEST COMMON DIVISORS
- NUMBER BASES

**PROBABILITY AND STATISTICS**

- PROBABILITY: Basic definitions, Basic Counting Techniques, Compound Probability
- STATISTICS: Sampling, 5 Number Summary, Box and Whisker Plots, Mean Absolute Deviation, Dot Plots