



Cheenta

Passion for Mathematical Science

Book List

If you are starting with the course, then you may buy the books in the Miscellaneous Section only. Later, your faculty will prescribe other books in class.

Miscellaneous

- Challenges and Thrills of Pre-College Mathematics by Venkatchala
- Excursion in Mathematics by Bhaskaracharya Pratishthana
- Problem Solving Strategies by Arthur Engel
- Test of Mathematics at 10+2 Level by East West Press
- IMO Compendium

Number Theory

- **NT I** Excursion in Mathematics; Challenges and Thrills of Pre-College Mathematics
- **NT.II** Elementary Number Theory by David Burton
- **NT.III** Elementary Theory of Numbers by W. Sierpinsky



Combinatorics

- **Com.I** Principles and Techniques in Combinatorics by Chen Chuan Chong and Koh Khee Meng
- **Com.II** Graph Theory by Harary
- **Com.III** Problem Solving Strategies by Arthur Engel
- **Com.IV** Notes by Yufei Zhao

Algebra

- **Alg.I** Excursion in Mathematics; Challenges and Thrills of Pre-College Mathematics
- **Alg.II** Polynomials by Barbeau

Geometry

- **Geo.I** Lines and Curves by Vasiliyev (something else)
- **Geo.II** Challenges and Thrills of Pre-College Mathematics
- **Geo.III** Geometric Transformation by Yaglom
- **Geo.IV** Notes by Yufei Zhao

Trigonometry

- **Trig.I** Trigonometric Delights by El Maor
- **Trig.II** Trigonometry by S.L. Loney
- **Trig.III** 101 Problems in Trigonometry by Titu Andreescu

Inequality

- **Ineq.I** Inequality by Little Mathematical Library
- **Ineq.II** Secrets in Inequalities by Pham Kim Hung



Complex Numbers

- **Complex.I** Complex Numbers from A to Z



Curriculum

Early Bird Curriculum

Number Theory I

This is the first course in elementary number theory:

- **NT.I.1** Primes, Divisibility
 - **NT.I.2** Arithmetic of Remainders
 - **NT.I.3** Bezout's Theorem and Euclidean Algorithm
 - **NT.I.4** Theory of congruence
 - **NT.I.5** Number Theoretic Functions
 - **NT.I.6** Theorems of Fermat, Euler, and Wilson
 - **NT.I.7** Pythagorean Triples
 - **NT.I.8** Chinese Remainder Theorem
-

Combinatorics I

This is the first course in combinatorics and elementary counting techniques:

- **Com.I.1** Multiplication and Addition rules
- **Com.I.2** Bijection Principles
- **Com.I.3** Combinatorial Coefficients
- **Com.I.4** Inclusion and Exclusion Principles
- **Com.I.5** Pigeon Hole Principle
- **Com.I.6** Recursions
- **Com.I.7** Shortest Route Problems



Algebra I

This is a first course in school algebra. (We assume that the student is familiar with algebraic expressions, and elementary algebraic identities)

- **Alg.I.1** Algebraic identities (Sophie Germain, Cube of three etc.)
 - **Alg.I.2** Mathematical Induction
 - **Alg.I.3** Binomial Theorem
 - **Alg.I.4** Linear Equations
 - **Alg.I.5** Quadratic Equation
 - **Alg.I.6** Remainder Theorem
 - **Alg.I.7** Theorems related to roots of an integer polynomial
-

Geometry I

- **Geo.I.1** Locus visualization
 - **Geo.I.2** Straight Lines
 - **Geo.I.3** Triangles
 - **Geo.I.4** Geometric Constructions
 - **Geo.I.5** Circles
-

Trigonometry I

- **Trig.I.1** Angle and rotation
- **Trig.I.2** Half arcs and Half chords - Genesis of trigonometric ratios
- **Trig.I.3** Elementary ratios and associated angles
- **Trig.I.4** Trigonometric identities
- **Trig.I.5** Geometry and trigonometry
- **Trig.I.6** Basic properties of Triangles



- **Trig.I.7** Compound Angles
 - **Trig.I.8** Multiple and Submultiple Angles
 - **Trig.I.9** Trigonometric Series
 - **Trig.I.10** Height and Distance
-

Inequality I

This first course in inequality must be preceded by a basic course in algebra.

- **Ineq.I.1** Geometric Inequalities
 - **Ineq.I.2** Arithmetic and Geometric Mean Inequality
 - **Ineq.I.3** Cauchy Schwarz Inequality
 - **Ineq.I.4** Titu's Lemma
-

Complex Number I

- **Complex.I.1** Geometry of Screw Similarity
 - **Complex.I.2** Field Properties of complex Number
 - **Complex.I.3** n th roots of unity and Primitive roots
 - **Complex.I.4** Basic applications to geometry
-



Intermediate Curriculum

Number Theory II

- **NT.II.1** Mobius Inversion Formula
 - **NT.II.2** Greatest Integer Function
 - **NT.II.3** Elementary Group Theory
 - **NT.II.4** Primitive roots and indices
 - **NT.II.5** Quadratic Reciprocity
 - **NT.II.6** Representation of Integers as sum of squares
 - **NT.II.7** Perfect Numbers
-

Combinatorics II

- **Com.II.1** Chu Shih Chieh' Identity (Hockey Stick)
 - **Com.II.2** Multinomial Coefficients
 - **Com.II.3** Advanced Pigeon Holes and Ramsay numbers
 - **Com.II.4** Catalan Numbers (and advanced bijection)
 - **Com.II.5** Stirling numbers of second kind
 - **Com.II.6** Generating functions
 - **Com.II.7** Non-linear recurrence
-

Algebra II

- **Alg.II.1** Elementary ring and field theory
 - **Alg.II.2** Eisenstein's criterion
-

Geometry II

- **Geo.II.1** Barycentric Coordinates



- **Geo.II.2** Miquel Point Configuration
 - **Geo.II.3** Translation
 - **Geo.II.4** Rotation
 - **Geo.II.5** Screw Similarity
-

Inequality II

- **Ineq.II.1** Schur's Inequality
 - **Ineq.II.2** Rearrangement Inequality
 - **Ineq.II.3** Jensen's Inequality
 - **Ineq.II.4** Bernoulli's Inequality and Power means
-

Complex Number II

- **Complex.II.1** Cyclotomic Polynomials
 - **Complex.II.2** Nine Point theorem and other geometric investigations using complex numbers
-



Advanced Curriculum

Number Theory III

- **NT.III.1** Thue's Theorem
 - **NT.III.2** Square Free Numbers
 - **NT.III.3** Diophantine Analysis of second and higher degrees
 - **NT.III.4** Arithmetic Progression whose terms are primes.
 - **NT.III.5** Trinomial of Euler
 - **NT.III.6** Scherk and Richart's Theorem
 - **NT.III.7** Amicable Numbers
 - **NT.III.8** Liouville function
 - **NT.III.9** Roots of polynomials and roots of congruences
 - **NT.III.10** Numeri Idonai
-

Combinatorics III

- **Com.III.1** Graph Theory
 - **Com.III.2** Invariance and Extremal Principles
 - **Com.III.3** Combinatorial Geometry
-

Algebra III

- **Alg.III.1** Polynomials
-

Geometry III

- **Geo.III.1** Inversive Geometry
 - **Geo.III.2** Advanced Application of complex numbers
 - **Geo.III.3** Projective Geometry
-

Inequality III

- **Ineq.III.1** Holder and Minkowski's inequality
-