



The students can take their examination in their respective regions. The regional coordinator will conduct the test in her/his region.

Any aspirant for the International Mathematical Olympiads such as IMO, EGMO, APMO and the domestic selection rounds (i.e RMO, INMO)

- ## Algebra

Recommended Books:

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Plane Geometry

Triangles, quadrilaterals, circles and their properties; standard Euclidean constructions; concurrency and collinearity (Theorems of Ceva and Menelaus); basic trigonometric identities, compound angles, multiple and submultiple angles, general solutions, sine rule, cosine rule, properties of triangles and polygons, Coordinate Geometry (straight line, circle, conics, 3-D geometry), vectors.

Recommended Books:

1. Geometry Revisited; *H.S.M Coxeter & S.L.Greitzer*
2. Problems in Plane Geometry; *I.F.Sharygin*
3. Plane Trigonometry; *S.L.Loney*
4. The Elements of Coordinate Geometry; *S.L.Loney*

Combinatorics

Basic enumeration, pigeonhole principle and its applications, recursion, elementary graph theory.

Recommended Books:

1. Introductory Combinatorics; *Richard A. Brualdi*
2. Discrete Mathematics: Elementary and Beyond;
László Lovász, József Pelikán, Katalin Vesztergombi
3. Combinatorial Techniques; *S. S. Sane*
4. Combinatorics For Mathematical Olympiad; *S. Muralidharan*

Number Theory

Divisibility theory in the Integers (The Division Algorithm, the Greatest Common Divisor, The Euclidean Algorithm, The Diophantine Equation $ax + by = c$), Fundamental Theorem of Arithmetic, Basic properties of congruence, Linear congruences, Chinese Remainder Theorem, Fermat's Little Theorem, Wilson's Theorem, Euler's Phi function and Euler's generalisation of Fermat's Theorem, Pythagorean triples (definition and properties), Diophantine equations.

Recommended Books:

1. Elementary Number Theory; *David M. Burton*
2. An Introduction to the Theory of Numbers;
Niven, Zuckerman, Montgomery

In addition to the books listed above the the question papers of earlier years (which are available at <http://olympiads.hbcse.tifr.res.in/subjects/mathematics/previous-question-papers-and-solutions>) and the following books may also be found helpful while preparing for the mathematical olympiad:

1. Problem Primer for Olympiads

C. R. Pranesachar, B. J. Venkatachala and C. S. Yogananda (Prism Books Pvt. Ltd., Bangalore).

2. Challenge and Thrill of Pre-College Mathematics

V. Krishnamurthy, C. R. Pranesachar, K. N. Ranganathan and B. J. Venkatachala (New Age International Publishers, New Delhi).

3. An Excursion in Mathematics

Editors: M. R. Modak, S. A. Katre and V. V. Acharya and V. M. Sholapurkar (Bhaskaracharya Pratishthana, Pune).

4. Problem Solving Strategies

A Engel (Springer-Verlag, Germany).

5. Mathematical Circles

Fomin and others (University Press, Hyderabad).

Many other interesting references may also be found in the book **An Excursion in Mathematics** mentioned above.

It must be noted that the topics listed above do not constitute an exhaustive list. Problems asked in the RMO and INMO may include topics not explicitly stated above.