International Math Olympiad Handbook – Grade 8

This handbook covers topics for Grade 8 students (Age 13–14).

Grade 8 (Age 13–14)

Introduction

Grade 8 students expand algebra, linear equations, inequalities, exponents, basic quadratic, probability, advanced geometry, and Olympiad problem-solving techniques.

Curriculum Topics

- Algebra: linear equations, inequalities, exponents
- Factorization, simple quadratics
- Geometry: angles, triangles, circles, polygons
- Pythagoras Theorem
- Perimeter, Area, Volume of solids
- Ratio, Proportion, Percentage
- Probability and Statistics
- Coordinate Geometry
- Word Problems
- Logical Reasoning and Puzzles

Examples & Explanations

- **Algebra:** Solve equations & inequalities

  Example: $2x - 5 > 7 \rightarrow x > 6$

- **Quadratics:** Factorization

  Example: $x^2 + 5x + 6 = (x+2)(x+3)$

- **Geometry:** Pythagoras theorem

  Example: Right triangle sides 3,4 → hypotenuse = 5

- **Probability:** Multiple events

  Example: Probability of even number on die = 3/6 = 1/2

- **Coordinate Geometry:** Midpoint, distance

  Example: Midpoint of (2,3) & (4,7) = (3,5)

Practice Problems

1. Solve: $3x - 7 \leq 8$
2. Factor: $x^2 + 7x + 12$
3. Pythagoras: sides 5,12 → hypotenuse = ?
4. Probability: card red from deck = ?
5. Distance between (1,1) & (5,4)
6. Word problem: $120 \div 6 + 15 = ?$