International Math Olympiad Handbook – Grade 7

This handbook covers topics for Grade 7 students (Age 12–13).

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Introduction

Grade 7 students focus on pre-algebra, ratio, proportion, percentages, integers, probability, basic coordinate geometry, and Olympiad-style problem solving.

Curriculum Topics

- Integers and Rational Numbers

- Fractions, Decimals, Percentages

- Ratio, Proportion, Rates

- Algebra: expressions, linear equations

- Geometry: triangles, quadrilaterals, circles, angles

- Coordinate Geometry: plotting points, distance

- Perimeter, Area, Volume

- Probability and Simple Statistics

- Word Problems

- Logical Reasoning and Puzzles

Examples & Explanations

- **Algebra:** Solve linear equations

  Example: $2x + 5 = 15 \rightarrow x = 5$

- **Fractions/Decimals/Percentages:** Solve problems

  Example: 25% of 240 = 60

- **Ratio/Proportion:** Scale problems

  Example: Map scale 1:100 $\rightarrow$ 3 cm = 300 cm actual

- **Geometry:** Angles, perimeter, area

  Example: Area of trapezium = 1/2 × (sum of parallel sides) × height

- **Coordinate Geometry:** Plot points, calculate distance

  Example: Distance between (1,2) and (4,6) = 5

- **Probability:** Simple events

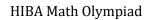 *Example:* Probability of head in coin toss = 1/2

- **Word Problems:** Multi-step reasoning

  Example: If 3 pencils cost \$9, 7 pencils cost ?

- **Logic/Puzzles:** Number sequences, patterns

Practice Problems

1. Solve: $3x + 7 = 22$

2. 45% of 200 = ?

3. 3:5 = ?/20

4. Distance between (2,3) and (5,7)

5. Area of trapezium a=4, b=6, h=5

6. Probability: roll a die, get 4

7. Word problem: $50 \div 5 + 12 = ?$

8. Pattern: 2, 6, 12, 20, ?