

International Math Olympiad Handbook

– Grade 6

This handbook covers topics for Grade 6 students (Age 11–12).

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Introduction

Grade 6 students extend arithmetic to fractions/decimals, introduction to negative numbers, ratio & proportion, geometry with angles and shapes, data analysis, and problem-solving strategies.

Curriculum Topics

- Integers and Negative Numbers
- Fractions, Decimals, Percentages
- Ratio and Proportion
- Algebra: simple expressions, equations
- Geometry: angles, triangles, quadrilaterals, circles, perimeter, area
- Volume and Surface Area
- Data Handling: bar charts, pie charts, line graphs
- Word Problems
- Logical Reasoning and Puzzles

Examples & Explanations

- **Integers:** Positive/negative numbers

Example: $-5 + 8 = 3$

- **Fractions/Decimals:** Advanced operations

Example: $\frac{3}{5} + \frac{2}{3} = \frac{19}{15} = 1 \frac{4}{15}$

- **Percentages:** Discounts, simple interest

Example: $10\% \text{ of } 200 = 20$

- **Ratio/Proportion:** Solve simple problems

Example: If 2 pens cost \$3, 5 pens cost \$7.5

- **Algebra:** Solve $2x + 5 = 13 \rightarrow x = 4$

- **Geometry:** Area, perimeter, angles

Example: Area of triangle $= \frac{1}{2} \times \text{base} \times \text{height}$

- **Volume/Surface Area:** Cubes, cuboids, cylinders

Example: Cylinder $r=3, h=5 \rightarrow \text{volume} = 141.37$

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

Example: $120 \div 4 + 15 = ?$

- **Logic/Puzzles:** Find missing number or pattern

Example: 1, 1, 2, 3, 5, ? $\rightarrow 8$

Practice Problems

1. $-8 + 12 = ?$
2. $\frac{3}{4} \times 8 = ?$
3. $10\% \text{ of } 150 = ?$

4. Solve: $3x + 7 = 16 \rightarrow x = ?$
5. Area of triangle base 6, height 4 = ?
6. Volume of cube side 5 = ?
7. Word problem: $80 \div 4 + 10 = ?$
8. Pattern: 2, 4, 8, 16, ?