

# MIOT Course Syllabus – AMC 8 Full-Year Course (2024-2025 FY)

Author: Zhe Chen

## Course Goal

The goal of this course is to (1) ignite strong interest in competition math among students; (2) help student build knowledge, tricks, and test strategy of taking the all math competitions test, primarily AMC 8. All the course topics are based on the coverage of AMC 8 materials, but this content is also applicable in other math competitions.

## What is AMC 8?

The AMC 8, also known as the American Mathematics Competitions 8, is a mathematics competition for students in middle school (grades 6, 7, and 8). It is one of most widely recognized math competitions organized by the Mathematical Association of America (MAA) and is designed to promote the development of problem-solving skills and an appreciation for mathematics among students.

## AMC 8 Awards

Achievement Roll (AR): Awarded to participants in grade 6 or below who achieve scores at or above the median (15 points) among all 8th-grade participants in the AMC 8 exam.

Honor Roll (HR): Awarded to participants who attain the top approximate 5% scores in the AMC 8 exam.

Honor Roll of Distinction (DHR): Awarded to participants who distinguish themselves with the top approximate 1% scores in the AMC 8 exam.

## Course Settings

This is aim to help student develop long-term knowledge and math modeling skills, so the target exam date is for AMC 8 in January 2026. Students are encouraged to also participate in January 2025. **For those who want to target AMC 8 in January 2025, we are open to have a Zoom-based class which focus on systematically practicing questions on past AMC 8 and other competitions.**

## Tentative Schedule

Week No.	Topics
Week 1	(class to public) Introduction to Math Competition, Prep Methodology and Syllabus
Week 2	Geometry – Knowledge Point Summary and Review
Week 3	Geometry – Similar / Congruent Triangles
Week 4	Geometry - Quadrilateral Models (Butterfly and Half Model)
Week 5	Geometry - Circle
Week 6	Geometry - Polygons and Irregular Shapes
Week 7	Geometry - Shaded Area Calculation Methods
Week 8	Geometry - 3D Geometry
Week 9	Number Theory - Number Set Classification and Notations / Ratio / Percentages / Proportions
Week 10	Number Theory - Divisibility Rule / Knock-out Method
Week 11	Number Theory - Prime Factorizations

Week 12	Number Theory - Greatest Common Divisor and Least Common Multiples
Week 13	Number Theory - Modular Arithmetic
Week 14	Number Theory - Digit Cycle
Week 15	Number Theory - Arithmetic Reasoning
Week 16	Number Theory - Repeating Decimals
Week 17	Algebra - Algebraic Operations
Week 18	Algebra - Telescoping / Grouping / Fraction Operations
Week 19	Algebra - Equations
Week 20	Algebra - Sequence and Series
Week 21	Algebra - Inequalities
Week 22	Application – Logic Reasoning
Week 23	Application - Trip Problems
Week 24	Application – Counting and Casework
Week 25	Application – Permutation and Combination
Week 26	Application - Stars and Bars Method
Week 27	Application – Basic Statistics, Graphs and Charts
Week 28	Application - Probabilities
Week 29	Application - Extreme Value Problem
Week 30	<b>Overall Review and Test Taking Strategies</b>

## Recommended Reading and Resources

1. American Mathematics Competitions (AMC 8) Preparation (Volume 1-5)
2. Past AMC Questions (1985-2024)

## Key Facts

1. Grade Level: The AMC 8 is specifically designed for middle school students in grades 6, 7, and 8. But we are seeing an increasing number of grade 3, 4, 5 participants in the recent years.
2. Format: The test typically consists of 25 multiple-choice questions, and students have 40 minutes to complete. Correct answers count 1 point each, while incorrect answers count 0 point each.
3. Content: The questions on the AMC 8 cover a wide range of mathematics topics, including arithmetic, algebra, geometry, number theory, and probability. The questions are designed to be challenging and require creative problem-solving.
4. Local Administration: Schools or math clubs can register to administer the AMC 8 at their locations. Students can take the test at their school under the supervision of a teacher or coordinator.

## Google Classroom Usages

There will be a lot of preview materials, placement tests, practice questions and mock tests available in the Google Classroom. Students will keep up with the course progress and achieve the most when promptly previewing the corresponding materials before each class and completing the practice questions after each class.