

Introduction to Different Mathematics Contests

I. Contests hosted by the **Mathematical Association of America (MAA)**

AMC 8 (American Mathematics Competition 8)

- **Format:** 25 multiple choice questions, 40 minutes. Covers middle school math curriculum. Calculators are not allowed.
- **Eligibility:** Students in grade 8 or below may participate (Students must be 14.5 years old or younger on the day of the test)
- **Time:** 2nd or 3rd Tuesday of November, once a year (2017 test date: **November 14, 2017**)
- **How to Register:** Through school teachers, online, math coaches, or parents willing to organize this event

AMC 10 A/B

- **Format:** 25 multiple choice questions, 75 minutes. Covers high school math curriculum, including topics before pre-calculus. You can take both the A and B test (the difficulty levels are the same, and no problems repeat). Calculators are not allowed.
- **Eligibility:** Students in grade 10 or below may participate (Students must be 17.5 years old or younger on the day of the test)
- **Time:** February of each year (2018 test dates: **A-Feb 7, 2018; B-Feb 15, 2018**)
- **How to Register:** Through school teachers, math coaches, or parents willing to organize this event

AMC 12 A/B

- **Format:** 25 multiple choice questions, 75 minutes. Covers high school math curriculum (nothing will need calculus, but it is helpful). You can take both the A and B test (the difficulty levels are the same, and no problems repeat). Calculators are not allowed.
- **Eligibility:** Students in grade 12 or below may participate (Students must be 19.5 years old or younger on the day of the test)
- **Time:** February of each year (2018 test dates: **A-Feb 7, 2018; B-Feb 15, 2018**)
- **How to Register:** Through school teachers, math coaches, or parents willing to organize this event

AIME I/II (The American Invitational Mathematics Examination)

- **Format:** 15 free answer questions (integers ranging from 000-999), 3 hours. You may take either AIME I or II, but not both. Calculators are not allowed.
- **Eligibility:** The student must qualify from AMC 10/12 (Top 2.5% AMC 10, Top 5% AMC 12)
- **Time:** March of each year (2018 test dates: **I-March 6, 2018; II-March 21, 2018**)

- **How to Register:** If you make this round, you will be notified, and information about the testing center will be provided to you.

USA(J)MO (The United States of America Mathematical (Junior) Olympiad)

- **Format:** 6 proof problems, 9 hours over 2 days. No calculus experience is necessary
- **Eligibility:** Around 270 top scoring students on both AMC 12 and AIME are invited to take the USAMO. Around 230 top scoring students on both AMC 10 and AIME are invited to take the USAJMO.
- **Time:** April of each year (2018 test dates: **April 18 & 19, 2018**)
- **How to Register:** If you make this round, you will be notified, and information about the testing center will be provided to you.

MOP (The Mathematical Olympiad Program)

- The top 50-60 students from USAMO are invited to participate in this free summer program. It serves as a preparation for IMO. The six-member team that will represent the U.S. in the following year's IMO is decided in MOP.

IMO (International Mathematics Olympiad)

- **Format:** 9 hours over 2 days, 4.5 hours per day; 3 proof problems per session
- **Time:** July of each year

II. MATHCOUNTS

- This is the largest math contest for middle school students (grades 6-8) in America.
- **Format:** 3 hours, divided into four rounds
 - **Sprint Round:** 30 free answer questions, 40 minutes, individual, calculators not allowed
 - **Target Round:** 8 free answer questions divided into 4 sets of 2, 6 minutes for each set, individual, calculators allowed
 - **Team Round:** 10 free answer questions, 20 minutes, team, calculators allowed
 - **Countdown Round:** the top 25% of students, up to a maximum of 10, from the individual rounds enter this round, head-to-head oral competition, calculators not allowed; this round is optional at the chapter and state levels, but it's an official part at nationals
 - The top 16 students compete in countdown in MN
- **Time:**
 - School: December or January during a school year
 - Chapter: February
 - State: March, each state selects a 4-person team to advance to nationals

- Nationals: May
 - Travel and lodging fees are covered by sponsors
 - The top individual/team will receive a high monetary prize
 - Countdown Round is broadcasted through ESPN
- **Eligibility:** students in grades 6-8. Every school can choose 10 individuals to participate in Chapter, including a 4-person team for team round
- **How to Register:** through parents or school teachers who organize your team

III. **ARML (American Regions Mathematics League)**

- ARML is an annual math contest. The questions cover high school math materials, but there are no strict requirements on the participants' ages. There are 4 locations that host this contest simultaneously: Penn State University, University of Iowa, University of Nevada, and University of Georgia. Each team consists of 15 members, and teams usually represent a state or a large city area.
- **Time:** the Saturday after Memorial Day
- **Format:**
 - Team Round (20 min)
 - 10 free answer questions, each worth 5 points
 - Power Round (60 min)
 - Proof based test, question number varies
 - Very obscure but sometimes interesting topics
 - A total of 50 points
 - Individual Round
 - A total of 10 questions given in sets of 2
 - Each question is worth 1 point
 - 10 minutes per set
 - Relay Round
 - The team is divided into 5 groups of 3, each occupying 1st, 2nd, and 3rd position
 - The answer from the previous position is needed to solve the questions for 2nd and 3rd positions
 - An answer can be submitted at 3 min and/or 6 min
 - Super Relay (not scored, for candy)
 - The entire 15-person team participate as one relay group
 - 1st position and 15th position solve their problems and pass the answers to 2nd and 14th positions respectively, and so on
 - 8th position will need answers from both front (7th) and back (9) to achieve the final answer
- **How to Register:** through volunteers who organize the team(s) in your area
- **How to Qualify for the MN ARML teams:**

- MN sends 4 teams to ARML: Gold (A1), Maroon (A2), White (A3), and Blue (A4)
- Students who finish in the top 10 of the MSHSML regular season meet individual standings, in the top 10 at the MSHSML State Tournament, achieve one of the top 10 scores in the state on the AMC 12, and/or achieve one of the top 10 scores in the state on the AIME, receive guaranteed invitations to compete in the ARML competition.
- Since these four groups inevitably overlap, the coaches select additional students to fill the remaining available training spots on the team. These further selections are gathered from MSHSML (those that qualify for the invitational), AMC 10, and MathCounts results, as well as teacher/coach recommendations.
- The selected students practice on several Saturdays in April/May in the Minneapolis/St. Paul metro area. Results from these practices are used to determine which 60 students will be invited to compete, as well as the placement of individuals on the 4 teams.

IV. Tournaments Hosted by Colleges

Harvard MIT Math Tournament (HMMT)

- 2 tournaments per school year--1 in November, 1 in February. Teams that want to participate can only attend one. The MN All-State Math Team attends the February tournament. You must qualify for ARML in order to apply for this competition.
- The team size for the November tournament is 4-6 students, and the team size for the February tournament is 6-8 students. Teams must be from a well-defined geographic region. Students can also register as individuals.
- **Format:**
 - Individual Rounds: 10 free answer questions, 50 minutes
 - Algebra/Number Theory, Geometry, and Combinatorics/Probability rounds
 - Team Round: 10 questions, 60 minutes
 - November: short answer questions
 - February: proofs
 - Guts Round (compete as teams): 36 problems, 80 minutes
 - After completing each problem, a teammate who acts as the runner runs to attain the next problem. The team that answers the most questions correctly within the time wins.
- **Time:** November and February of each school year
- **How to Register:** students can form teams and register themselves. However, since more teams apply than the competition can hold, top teams from the previous tournament automatically qualify, and a game of chance is played for all other teams.

Princeton University Math Competition (PuMAC)

- A full team will consist of 8 members.

- Two divisions--A and B
- <https://pumac.princeton.edu/info/competition-rules/main-competition/>
- **Format:**
 - Individual Rounds:
 - Algebra/Number Theory, Geometry, and Combinatorics/Probability rounds
 - Team Round
- **Time:**
- **How to Register:** students can form teams and register themselves. However, since more teams apply than the competition can hold, top teams from the previous tournament automatically qualify, and a game of chance is played for all other teams.

V. **Mathematics Olympiads for Elementary and Middle Schools (MOEMS)**

- This competition starts in November of each school year and ends in March of the same school year, with one contest each month. The competition can be held at any school or institution. This competition has 2 divisions: Division E (grades 4-6) and Division M (grades 6-8).
- **Format:**
 - Each contest consists of five nonroutine problems
 - Each question has a time limit, with the total being around 25 minutes
 - Each student scores 1 point for each correct answer. Thus, a student may score up to 25 points per year.
 - Calculators are not permitted
- **Time:** *Please note that RMC has different test dates from the ones listed on the MOEMS website: November 22, 2017; December 20, 2017; January 24, 2018; February 21, 2018; March 14, 2018
- **How to Register:** through your school, institution, or upon organization by parents
 - Each school or institution can register more than 1 team, but each team cannot exceed 35 members. The final team score is determined by the top 10 individual scores from the 5 contests.

VI. **Minnesota State High School Mathematics League (MSHSML)**

- This is a statewide contest in which high school students participate in teams organized by their schools. Schools belong to divisions of five to ten schools, and the schools in the same division come together for 5 meets each season. Each school competes with a team of up to eight students and an unlimited number of individual participants. The season runs from early November to early February.
- **Format:**
 - Individual Events (there are 4 events, each participant can choose a maximum of 2): for each event--4 free answer questions, 12

minutes at division meets, 15 minutes at state, *20 minutes for meet 5 event A

- The first question is worth 1 point, and the rest are worth 2 each. 7 is the perfect score for each individual event.
- Team Event: 6 free answer questions, 20 minutes at division meets, 30 minutes at state
 - Each question is worth 4 points with a total of 24 points
- Invitational Event (occurs at state, students with the top ~50 individual scores are invited): 8 quickies worth 1 point each, 4 problems worth 2 points each, 2 challenge problems worth 4 points each, 30 minutes
 - The students with the top 10 scores qualify for the Math Bowl (for fun only, it's a quick-response, elimination competition)
- The top school, sometimes the top 2 schools, in each division qualifies for the state tournament
- **Time:**
 - Meet 1: November 6, 2017
 - Meet 2: November 27, 2017
 - Meet 3: December 18, 2017
 - Meet 4: January 22, 2018
 - Meet 5: February 12, 2018
 - State: March 12, 2018
- **How to Register:** through your school's team