Camp Information for Parents

MAST

August 2 – August 6

Thank you for considering the 2021 MAST Summer Camp. Here are a couple of details so you can decide whether the camp is right for you.

1 About Us

MAST is a student-run organization that has taught over 50 students in the past year in a year-long AIME training program. It has a highly-qualified teaching team with several USA(J)MO and MOP qualifiers which has developed hundreds of pages of material and with years of teaching experience. We believe that the MAST program stands out based on its teaching approach which provides many resources for learning outside of the classroom and peer-to-peer interaction. The website for the camp can be found on camp.mathadvance.org.

Your instructors will be:

- Dennis Chen
- Isaac Chen
- William Dai
- Ethan Han
- Ethan Liu
- Kelin Zhu

All of them have qualified for and scored well on the AIME. Half of them have qualified for the USA Math Olympiad or the USA Junior Math Olympiad, and one of them has attended the MOP summer camp.

2 Course Synopsis

Our target students are those looking to qualify for AIME with scores of about 80 to 110 on the AMC 10 and low-level AIME qualifiers who want to raise their score to at least 5.

Each of the ten classes will be based on a different topic. Subtopics for each class have also been provided.

2.1 Algebra

1. **Algebraic Manipulation:** Symmetric Systems, Symmetric and Cyclic Expressions, Identities for the Ceiling, Floor, and Fractional Part functions, Absolute Value, Substitution
2. **Roots of a Polynomial:** Vieta's Formulas, Newton's Sums, Reciprocal Roots, Polynomial Interpolation, Rational Root Theorem, Conjugate Root Theorem, Radical Conjugate Root Theorem

2.2 Combinatorics

3. **Introduction to Combinatorics:** Independent Choices, Dependent Choices, Basic Bijections, Permutations, Combinations, Block Walking,
4. **Perspectives in Combinatorics:** The Principle of Inclusion-Exclusion, Advanced Bijections, Combinatorial Identities,
5. **Casework:** Techniques in Casework, Multiplicative Casework, Additive Casework, Complementary Casework

2.3 Geometry

6. **Angle Chasing:** Parallel Lines, Postulates, Properties, and Formulas for Angles, Properties of Angles in Triangles, Regular n-gon, and With Parallel Lines
7. **Introduction to Length Chasing:** Similar Triangles, Power of a Point, Heron's Formula, Incircle Radius Formula, Properties of Incircles,

2.4 Number Theory

8. **Modular Arithmetic:** Divisibility, Definitions of Modular Arithmetic, Modular inverses, Wilson's Theorem,
9. **Prime Factorization, GCD, and LCM:** P-adic valuation (Prime Factorization Analysis), Definition and Properties of GCD and LCM, Fundamental Theorem of Arithmetic, Number of Divisors Formula, Sum of Divisors Formula,

2.5 Miscellaneous

10. **Careful!:** Common pitfalls or mistakes, suggestions on how to increase accuracy and speed, [1]

3 Logistics

To sign up, please fill out the Google Form at tiny.cc/mast-camp.

The camp takes place between August 2 and August 6. Each day, class is held between $9:00-10:30$ AM Pacific and $1:00-2:30$ PM Pacific. The cost of the camp is \$75 or \$5 per hour of class.

Class will be held on Zoom, and materials such as slides or handouts will be sent out on Google Classroom. The links to both will be sent to registered students prior to the first class. Each class will have a corresponding handout that will be sent out about two days before that class. Each handout will be about seven to eleven pages long and will contain a problem set with about twenty problems with point values for students to complete after the lesson. It is not required but recommended for students to briefly read through the handouts before the lesson; the material often requires deep understanding and repeat reading boosts student learning. In order for students to gain the maximum benefit from this camp, it is expected that students complete the minimum point requirement in the problem set after class in order to attain mastery of the topic. If students have trouble with problems, they are able to email the instructors at any time for help.

[1] This class does not cover any theorems but rather is focused on how to make students do as best as they can on contests. In our experience, knowing these strategies can increase scores substantially.

3.1 Payment

Payment must be made before the first class. Please read this carefully: **under no circumstances will we be offering refunds**. This is because after the first day, the student will already have seen a large portion of the content as we will release handouts in advance.

In order to make the payment, send $75 to paypal.me/matournament.[2] It is optional, but highly requested, that you send the money as a friend in order to avoid incurring us a fee.

Please make sure you **leave a note with the parent's name (who filled out the registration form) and student's name** so we can process the payments correctly.

[2]Please ignore the name. This is the correct PayPal page for MAST. We were unable to change the name after using this PayPal for the MAT