AIME Geometry (Live Zoom Class)

Instructor: Dr. Ke Shi

Lecture Time and Location: Fridays 8:00pm – 10:00pm EST via Zoom. (15 lectures)
Homework Discussion: Recorded discussion with detailed solution provided.

Course Description:

This course is specially designed for highly motivated students who are either qualified for AIME or are on the verge of achieving it. Our intensive program focuses on providing students with the essential tools to enhance their problem-solving skills in geometry, with the goal to excelling in the AMC 10/12 and AIME exams.

Geometry is one of the most important topics in AIME as well as AMC 10/12 exams. On average, each AIME test comprises 4-5 questions related to geometry. This course will review and establish connections between topics covered in the AoPS Introduction to Geometry. In addition, students will extensively study trigonometry including graphs, trigonometric identities, the Law of Sines, the Law of Cosines, and their applications in AMC 10/12 and AIME exams. The difficulty level of this course is comparable to that of problems 18-25 in AMC 10/12, and problems 1-13 in AIME.

Prerequisite:

To fully benefit from this course, we recommend that students have already completed the introductory level course in geometry (e.g., AoPS Introduction to Geometry). Basic trigonometry knowledge is highly recommended. We will delve deeper into the contents of most chapters in AoPS Introduction to Geometry book to meet the standard of median to hard geometry questions found in AMC 10/12 and AIME exams.

Recommended Textbook and Course Materials:

- Lecture notes by Dr. Shi,
- Awesomemath 106,
- AoPS Precalculus (and Solution Manual),
- Past AMC 10/12 and AIME tests

Signature Features of the Course:

Dr. Shi has developed a unique training program that combines his experience in math competitions since childhood in China, his undergraduate and graduate studies in mathematics at Peking University and the University of Minnesota, and his experience as a math professor in the United States. These courses are designed to help students excel in math competitions such as the AMC10 and AIME that have an impact on college admissions.

Dr. Shi's teaching approach is distinctive in its emphasis on integrating various topics coherently, which simplifies complex concepts and makes them easier to grasp. Dr. Shi is especially sharp at identifying the "key" to solving difficult problems and helping students see through complex problems with ease. This teaching method is especially helpful for students who have a certain foundation but have reached a bottleneck stage.

Dr. Shi's courses build on the AoPS curriculum, and he has added his unique content and combined it with competition exam questions from previous years to help students expand and improve their understanding

and mastery of knowledge points. His self-study courses consist of 2 hours of personal instruction each week, accompanied by lecture notes and weekly homework assignment.

Course schedule

Lesson	Topic
10.18	Right Triangles
10.25	From Area Ratio to Ceva and Menelaus Theorems
11.1	Centers in Triangles I: Centroid, Incenter, Excenter
11.8	Centers in Triangles II: Incenter, Orthocenter
11.15	Power of a point, tangents
11.22	Cyclic quadrilateral I, Fermat Point
12.6	Conic Sections, Analytic Geometry
12.13	Three-dimensional Geometry
12.20	Trig Identities
12.27	Law of Sine, Law of Cosine, Solving triangles
1.3	Cyclic quads with Trig
1.10	Graph Construction
1.17	Complex plane basic
1.24	Roots of polynomials, Trig with complex numbers
1.31	Max/Min optimization

Dr. Shi's Background:

Dr. Ke Shi is a highly respected mathematics professor at a top-tier (R1) research university in the US. He obtained his Bachelor's degree in Mathematics from Peking University in China and his PhD in Applied Mathematics in US. Dr's Shi's exceptional talent and dedication to mathematics have been recognized throughout his academic and professional career. He began participating in math contests at the age of 10 and received numerous awards in national and international math competitions. Notably, he earned a Silver Medal in the Chinese Mathematics Olympiad (CMO), which is considered analogous to the USAMO, and a Silver Medal in the Bulgarian Mathematics Olympiad. Dr. Shi was also invited to attend the prestigious Chinese Mathematical Olympiad Program (MOP). As a result of his outstanding performance in national and international math competitions, Dr. Shi was admitted to Peking University without having to take the admission test, a rare achievement that further demonstrates his exceptional abilities in mathematics.