

Intermediate Algebra (Live virtual classes 2026-27)

Instructor: Dr. Ke Shi

➤ Lectures: **Saturdays, 12:30 - 2:00pm EST (August 29, 2026 – March 7, 2027, 24 lectures)**

Location: Virtually via Zoom

Textbook and Supplementary Course Materials:

- *Lecture Notes by Dr. Shi;*
- *AoPS Intermediate Algebra (and Solution Manual)*
- *Free worksheets in Kutasoftware.com*
- *The course materials will remain accessible for an additional month following the final lecture.*

Course schedule (tentative)

Lecture	Date	Topic
1	8/29/2026	Solving linear systems
2	9/5/2026	Functions and graph transformations
3	9/12/2026	Complex numbers
4	9/19/2026	Quadratics
5	9/26/2026	Discriminant Applications
6	10/3/2026	Conic Sections I
7	10/10/2026	Conic Sections II*
8	10/17/2026	Polynomial Division
9	10/24/2026	Roots and Polynomial Factorization
10	10/31/2026	Vieta and Fundamental Theorem of Algebra*
11	11/7/2026	Graphs of polynomials
12	11/14/2026	Multivariable polynomials*
13	11/21/2026	Sequences and Series
14	12/5/2026	Telescoping*
15	12/12/2026	Exponents and Logarithms 1
16	12/19/2026	Exponents and Logarithms 2
17	1/9/2027	Radical Functions
18	1/16/2027	Rational Functions and Inequalities
19	1/23/2027	Establishing identities by algebraic manipulation
20	1/30/2027	Math Induction and Binomial Theorem
21	2/13/2027	Partial Fraction, Even/Odd and Monotonic Functions
22	2/20/2027	Piecewise Defined Functions*
23	2/27/2027	Floor and Ceiling Functions*
24	3/7/2027	AM-GM Inequalities and its applications*

* This lecture includes unique, enriched content specially created by Dr. Shi to help students deepen their knowledge and improve their problem-solving skills.

Holiday Breaks: No classes during the weekends of Thanksgiving, Christmas, New Year and Chinese New Year.

Prerequisite:

Completion of the **Introduction to Algebra 1** and **Introduction to Algebra 2** courses or similar programs is recommended to ensure that students have the necessary Algebra skills.

Targeted Level:

For students looking to excel in school math curricula, we will cover most of the topics in the textbook to provide a comprehensive understanding of algebra. In addition, for those preparing for the AMC 10/12 and AIME exams, we have enriched the content in selected chapters to meet the specific requirements of the contests.

Signature Features of the Course:

The Intermediate Algebra course is divided into two parts, and this course covers the material from the first part. The course is intended to be beneficial for students seeking to excel in their school math curriculum as well as for those aiming to excel in math competitions. Although the course is based on the AoPS Intermediate Algebra textbook, it is differentiated by Dr. Shi's distinctive teaching style. Below are some of the hallmark features of the course and Dr. Shi's instructional approach.

➤ **Enhanced content beyond AoPS**

Dr. Shi has added exclusive, enriched content to the materials covered by the AoPS book to increase the effectiveness of learning. The chapters that are particularly enhanced by the added content are marked with a star (*) symbol. This enriched content goes beyond the scope and depth of the AoPS book. It helps students establish a stronger foundation in Algebra, promoting a deeper understanding of the subject matter. The enriched content can be particularly beneficial for students who aspire to set a solid foundation in Algebra for the AMC 10/12 and AIME competitions. A solid foundation in Algebra also helps students who focus on excelling in their academic studies to perform better in the subsequent more advanced courses such as Precalculus and Calculus.

➤ **Unique teaching approach at problem solving**

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. Moreover, he often connects the keys and offers students a bigger picture of the underlying connection of these concepts. This rare quality in math instructions can lead to significant improvement over time, as students themselves gain the ability to solve difficult problems with ease.

➤ **Additional support on homework assignments**

To provide students with further support, each 1.5-hour lecture taught by Dr. Shi is followed by a 1-hour homework review session led by a teaching assistant (under Dr. Shi's guidance). This review session is intended to offer instant feedback on students' homework and provide additional assistance as needed.

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 USA. 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.

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