

AoPS Algebra 1

Course description

“Introduction to Algebra” (Also called Algebra 1), is designated for students who have completed a Prealgebra course. This course covers much of the algebra of a typical honors Algebra 1 course, and some of the content of an honors Algebra 2 course. At least, one school year is needed to complete this course that is divided into two parts to be taught in two semesters, respectively. Part 1 is called **Algebra 1A**, introducing the fundamental concepts of algebra, exponents and radicals, linear equations and inequalities, ratio and proportion, systems of linear equations, factoring quadratics, complex numbers, completing the square, and the quadratic formula. Part 2 is called **Algebra 1B**, including quadratics, systems of equations, clever factorizations, complex numbers, functions, graphing, sequences and series, special functions, exponents and logarithms, and more.

The text in the textbook is structured to inspire students to explore and develop new ideas. Each section starts with problems, giving the students a chance to solve them without help before proceeding. The text then includes solutions to these problems, through which algebraic techniques are taught. Important facts and powerful problem solving approaches are highlighted throughout the text.

The course will combine the concepts and problem solving techniques with amount of class practices. That will make students understand the fundamental, digest and enhance the comprehension during the class time.

Who should take Algebra 1A

Students are ready for this class if they have mastered arithmetic with fractions, decimals, percents, negative numbers, and integer exponents. Most students who have completed a typical Prealgebra course are ready for this section.

Who should take Algebra 1B

Students are ready for this class if they have mastered square roots and fractional exponents, order of operations, linear equations and inequalities, ratio, and proportion. We recommend that students have experience with factoring quadratics prior to taking this section.

The requirement for students who register this course

In general, students in grade 6 – 9 are eligible to register this course. All students who want to take this course should pass the evaluation test. Test questions are posted in NCLS website <http://www.newtonchineseschool.org/principal/TestforAlgebra1A.pdf> and <http://www.newtonchineseschool.org/principal/TestforAlgebra1B.pdf>.

Student eligible to take the first part of Algebra 1 should take Test of Algebra 1A, or Test of Algebra 1B for the second part of Algebra 1. Please check the class schedule of Algebra 1A and Algebra 1B at NCLS website.

Even though successful registration to the class, the students may be asked to change to appropriate class if the student has difficulties to understand the contents, or is not able to complete practices or assignments, or couldn't pass the quiz test, etc.

Textbook

Students must have the textbook to take this course. The book could be purchased online: <https://www.artofproblemsolving.com/store/list/aops-curriculum>

Introduction to Algebra, the Art of Problem Solving, by Richard Rusczyk

ISBN: 978-1-934124-14-7

Syllabus of Algebra 1A

Lesson 1	Follow the Rules
Lesson 2	Fractional Exponents, Radicals, and Variables
Lesson 3	Variables and Expressions
Lesson 4	Linear Equations
Lesson 5	More Variables
Lesson 6	Linear Equations with Multiple Variables
Lesson 7	Ratio and Percent
Lesson 8	More Ratios and Proportion
Lesson 9	Common Errors and Challenging Problems
Lesson 10	Graphing Lines (Part 1)
Lesson 11	Graphing Lines (Part 2) and Introduction to Inequalities
Lesson 12	Graphing Inequalities
Lesson 13	Quadratic Equations (Part 1)
Lesson 14	Special Factorizations
Lesson 15	Simon's Favorite Factoring Trick and Complex Numbers
Lesson 16	Quadratic Equations (Part 2)

Syllabus of Algebra 1B

Lesson 1	Factorization
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Lesson 2	Quadratics and Complex Numbers
Lesson 3	Completing the Square and the Quadratic Formula
Lesson 4	Graphing Quadratics
Lesson 5	Quadratic Inequalities
Lesson 6	Optimizing Quadratics and AM-GM Inequality
Lesson 7	Functions
Lesson 8	Composition and Inverses
Lesson 9	Graphing Functions
Lesson 10	Polynomials
Lesson 11	Exponential Functions
Lesson 12	Special Functions Part 1
Lesson 13	Special Functions Part 2
Lesson 14	Sequences & Series Part 1
Lesson 15	Sequences & Series Part 2