Algebra 2 Part 2, Spring 2026

(Part 1 was offered in Fall 2025)

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TO REGISTER: **https://xumath.org**

WHEN, WHERE AND HOW MUCH?

Term: Jan 17, 2026 – May 30, 2026

In-Person (at PolyEducation) and Virtual (live zoom) Lecture:
11:00am-1:00pm (CT), Sat

TA Office Hours: 1.5 hours zoom Q&A each week, date & time (TBD)

Video of Homework Solving: Posted after Homework due time

In-Person Address: PolyEducation, 4116 W Spring Creek Parkway, Suite C500, Plano, TX 75024

Format:

- 20 2-hour in-person or live zoom lectures + 20 1-hour homework solving videos + 20 1.5-hour TA Q&A
- 18 homework assignments (to be graded) + 2 take-home exams (to be graded)

Note: A student can request the video of a class if the class has to be missed.

Tuition: **$950** (register by Nov 23, 2025), **$980** (register after Nov 23, 2025)

WHO TEACHES?

Dr. Sheng Xu: Associate professor of math at Southern Methodist University

- Received Ph.D. from Cornell and did post-doc at Princeton and Cornell
- Taught 12 different undergraduate and graduate math courses at SMU in past 19 years
- Received Betty McKnight Speairs Endowed Teaching Excellence Award
- Recommended by students and parents in anonymous testimonials on https://xumath.org/testimonial/
- Published an undergraduate textbook *Introduction to Scientific Computing with Matlab and Python Tutorials*, Taylor Francis, 2022

COURSE INFO

Syllabus, Sample Notes and Videos: **https://xumath.org**

Required Textbooks:

- **[1]** Customized notes by Prof. Xu with reference to various books (available before each class)
- **[2]** Ron Larson et al., *McDougal Littell Algebra 2*, 1st Edition (for homework problems)

References:

- **[3]** R. Rusczyk and M. Crawford, The art of Problem Solving (AoPS) Intermediate Algebra: optional challenging problems mainly from this book
- **[4]** Ron Larson et al., *Precalculus With Limits: A Graphing Approach (Advanced Placement Version)*, 4th Edition

SCHEDULE

Part 1 (Fall 2025)

Unit 1: Fundamental Concepts

1. Numbers (e.g. real numbers); Arithmetic(e.g. order); Expressions (e.g. simplification)
2. Laws (e.g. laws of algebra); Equations and Inequalities (e.g. absolute value equations and inequalities)
3. Linear Systems (e.g. systems of three linear equations); Inequalities (e.g. systems of inequalities)
4. Functions (e.g. definition, evaluation, modeling, composition)
5. Functions (e.g. graphs)

Unit 2: Polynomial Functions, Expressions and Equations

1. Complex Numbers (e.g. complex plane, conjugate, arithmetic)
2. Quadratic Equations (e.g. completing the square, quadratic formula, discriminant, roots and coefficients)
3. Quadratic Functions and Inequalities (standard form, graphs, maxima and minima, inequalities)
4. Polynomial Division (e.g. long and synthetic divisions)
5. Polynomial Factorization (e.g. fundamental theorem of algebra, multivariable polynomials, inequalities)
6. Polynomial Roots (e.g. tests of rational roots, Vieta's formulas)

Unit 3: Analytic Geometry and Conics

1. Cartesian Coordinate System (e.g. graphs of equations, distance, midpoint, circles)
2. Parabolas (e.g. symmetry, shifting)
3. Circles and Ellipses (e.g. standard form, rotation)
4. Hyperbolas (e.g. asymptotes)

Part 2 (Spring 2026)

Unit 4: Rational Functions, Expressions and Equations

1. Rational Expressions (e.g. inverse variation, combination, simplification, partial fractions)
2. Rational Functions (e.g. graphs)
3. Rational Equations and Inequalities (e.g. table of intervals)

Unit 5: Radical Functions, Expressions and Equations

1. Radical Functions (e.g. roots, graphs)
2. Radical Expressions: (e.g. combination, simplification, complex numbers)
3. Radical Equations and Inequalities (e.g. danger of squaring)

Unit 6: Exponential and Logarithmic Functions and Equations

1. Exponential Functions (e.g. Euler's number e, graphs)
2. Logarithmic Functions (e.g. evaluation of logarithm, graphs)
3. Laws of Exponents and Logarithms (e.g. change of base)
4. Exponential and Logarithmic Equations (e.g. hyperbolic functions)

Unit 7: Others

1. Arithmetic and Geometric Sequences (e.g. recurrence, general term)
2. Arithmetic and Geometric Series (e.g. partial sum, sum, convergence)
3. Counting (e.g. permutations, combinations)
4. Binomial Theorem (e.g. binomial coefficients) and Mathematical Induction
5. Trigonometry and Trigonometric Functions