Algebra 2 Part 2, Spring 2027

(Part 1 was offered in Fall 2026)



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

WHEN, WHERE AND HOW?

Term: Jan 9, 2027 – May 8, 2027

In-Person & and Live zoom Lecture: 11:00am-1:00pm (CT), Sat

TA Office Hours: 8-10pm CT, Wed & Sun

Video of Homework Solving: Posted on Wed after Homework due time

In-Person Addr: PolyEducation, 4116 W Spring Creek Pkwy, Suite C500, Plano, TX 75024

Format:

- 18 2-hour in-person or live zoom lectures + 18 1-hour homework solving videos + 2 review videos for exams
- 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: **$860** (register by Nov 22, 2026), **$890** (register after Nov 22, 2026), 5% PolyEducation multi-course tuition discount (details in registration form)

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 20 years
- Received Betty McKnight Spears Endowed Teaching Excellence Award
- Recommended by K12 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: fundamental homework problems

References:

- **[3]** R. Rusczyk and M. Crawford, The art of Problem Solving (AoPS) Intermediate Algebra: Some challenging homework problems are from the book.

SCHEDULE

Part 1 (Fall 2026)

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 2027)

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. Problem-Solving Strategies