

Geometry

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United States



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TO REGISTER: <https://xumath.org>

WHEN, WHERE, HOW MUCH?

Term: June 2 – Aug. 10, 2025

In-Person and Live Zoom Lecture: Mon. 7-9pm CT, Fri. 5-7pm CT

Recitation Video: Available on Canvas on Wed. & Sun.

In-Person Address: QD Academy, 4100 Legacy Drive, Suite 404, Plano, TX 75024
or 4116 W Spring Creek Parkway, Suite 500, Plano, TX 75024

Format:

- 20 2-hour lectures + 20 1-hour homework recitation videos
- 20 homework assignments (to be graded) + 2 exams (to be graded)
- A student can request the video of a class if the student has to miss the class.

Tuition: \$940 (if register and pay by March 15), \$970 (after March 15)

WHO TEACHES?

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

- Ph.D. from Cornell and post-doc at Princeton and Cornell
- 17 years and 15 math courses teaching experience
- Betty McKnight Spears Endowed Teaching Excellence Award in Math
- Recommendation by K-12 students and parents in anonymous testimonials on <https://xumath.org/testimonial/>
- Author of an undergraduate textbook *Introduction to Scientific Computing with Matlab and Python Tutorials*, Taylor Francis

COURSE INFO

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

Required Textbooks:

- [1] Customized notes by Prof. Xu (available before each class)
- [2] Ron Larson et al., *McDougal Littell Geometry*, 10th Edition, ISBN 0-618-25022-0: fundamental homework problems from this book
- [3] R. Rusczyk, *The art of Problem Solving (AoPS) Introduction to Geometry*: challenging problems mainly from this book

References:

- [4] D.C. Alexander & G.M. Koeberlein, *Elementary Geometry for College Students*, 6th Edition, ISBN 1-285-19569-8
- [5] R.C. Jurgensen et al., *Geometry*, ISBN 0-395-97727-4

TOPICS

Unit 1: Basics of Geometry

1. Introduction and Overview
2. Points, Lines, Planes, Segments, Angles
3. Measurements, Relationships, Perimeter, Circumference, Areas
4. Proofs: Induction, Deduction, Proof by Contradiction

Unit 2: Perpendicular and Parallel Lines

1. Properties of Perpendicular and Parallel Lines
2. Proving Lines are Parallel or Perpendicular
3. Linear Functions and Equations for Lines

Unit 3: Congruence

1. Proving Triangles are Congruent
2. Using Congruence
3. Special Triangles
4. Proofs using Coordinates

Unit 4: Properties of Triangles

1. Bisectors, Medians and Altitudes
2. Triangle Inequalities

Unit 5: Quadrilaterals and Polygons

1. Parallelograms, Rhombuses, Trapezoids and Kites
2. Areas of Quadrilaterals
3. Polygons: Angles, Perimeters, Areas

Unit 6: Similarity

1. Proportion and Similarity
2. Proving Triangles are Similar
3. Using Similarity: Length and Area

Unit 7: Right Triangles and Trigonometry

1. Right Triangles: Similarity, Pythagorean Theorem
2. Solving Right Triangles

Unit 8: Circles

1. Tangents, Arcs, Chords, Inscribed Angles, Sectors
2. Relationships in Circles
3. Circumference, Arc Length, Areas
4. Geometric Probability
5. Equations of Circles

Unit 9: Transformations and 3D Shapes

1. Translations, Reflections and Rotations
2. Prisms, Cylinders, Pyramids, Cones, Spheres
3. Similar Solids