

Geometry

MTH 329 [35469] Spring 2026

Mon-Wed, 4:40 pm - 6:20 pm, Room 1S-112

Instructor: [Abhijit Champanerkar](#)

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Office Hours: Mon-Wed 3 - 4 pm, and by appointment

Class Homepage: <http://www.math.csi.cuny.edu/abhijit/329/>

[Academic Calendar](#) [First Day Handout](#)

Course Information

Course Description: This course will cover classical Euclidean geometry, and modern non-Euclidean geometries. Topics include - Classical Euclidean Geometry, Euclidean plane and isometries, Spherical geometry and isometries, Euler's formula, Regular polyhedra, Hyperbolic geometry and isometries, and other related topics. We will also emphasize how to write concise and complete arguments.

Students are expected to be familiar with high-school geometry; for review, see www.mathopenref.com, a free online math textbook for high-school geometry.

Textbook: [Geometry: The Line and the Circle](#) by Maureen T. Carroll and Elyn Rykken. Print ISBN: 978-1-4704-4843-1 and Electronic ISBN: 978-1-4704-5063-2. Students are required to have an (inexpensive) compass and ruler.

Homework & Quizzes: Assignments will be announced in class, and posted on Brightspace, usually referring to this website. Homework is to be submitted online as a legible pdf on Brightspace. I highly recommend working jointly on homework problems with fellow students. Quizzes, if any, will be announced in class ahead of time.

Labs: We will use **GeoGebra**, a free interactive geometry app. The authors have provided a supplemental PDF of lab projects called [GeoGebra Labs](#). Use [GeoGebra online](#) or follow their instructions to install GeoGebra Classic 6 at www.geogebra.org/download. Then download a [zip file of GeoGebra Lab starter files](#), and extract them on your computer.

Student presentations: There will be three student presentations tentatively scheduled on: **Mon Feb 23rd, Mon Mar 16th, Mon May 24th.**

Exams: There will be two in-class exams tentatively scheduled below. Without exception, you must take the final exam at the time scheduled by the college.

- **Exam 1:** Mon March 2nd
- **Exam 2:** Mon March 30th

- **Final Exam:** Mon May 18th

Grading: The course grade will be determined (subject to changes announced in class) by by your scores on homework, labs, presentations, quizzes, exams and final exam approximately as follows:

HW, Quizzes & Labs (10%), Presentations (20%), Exams (20% each), Final (30%).

Help: My office hours are on Mondays and Wednesdays 3 - 4 pm, in my office, 1S-230. Email is the fastest way to contact me.

Optimal Method of Study: (1.) Come to class (attendance is mandatory). (2.) Read the relevant sections and websites after class. (3.) Do the homework. Leave time to think--do not put homework off until it is due! (4.) Compare your solutions with other students. (5.) Come to office hours or email with any questions.

Course schedule and Homework

Here is the course syllabus (subject to changes announced in class). Section and problem numbers refer to **Geometry: The Line and the Circle**.

Date	Topic	Reading	Homework
1 Mon Jan 26	Intro to Euclid's Elements and constructions , Book 1: Neutral Geometry	Ch. 1 and Ch. 2 Ch. 3.1	1.3.1, Lab 1, 3.1.1, 3.1.7, 3.1.8, 3.1.10 Due: Wed Feb 4
2 Wed 28	Book 1: Neutral Geometry	Ch. 3.2	3.2.6, 3.2.8, 3.2.10, Lab 2 Due: Wed Feb 4
3 Mon Feb 2	Book 1: Neutral Geometry	Ch. 3.3, Triangle Inequality Thm	
4 Wed Feb 4	Book 1: Neutral Geometry	Ch. 3.3, Quads Venn diagram , Quad properties , Compass constructions	
5 Mon Feb 9	Vectors and dot product	Stillwell ch4 , Leading Lesson 1 , Leading Lesson 2	
6 Wed Feb 11	Spherical geometry	Ch. 4.1-4.4, Ryan , Polking , Dimensions Ch 1 , Spherical Geometry , MH370 search circle	
Mon Feb 16	No classes		
7 Wed Feb 18	Spherical triangles and Girard's Theorem	Ch. 4.5, Exterior Angles Thm , Girard's Theorem (slides)	
8 Mon Feb 23	Stereographic projection and maps	Student Presentations #1 Ch. 4, Map distortion , Gall-Peters (West Wing) ,	

		Stereographic projection (AMS feature column) , Dimensions Ch 9 , Peters vs Mercator , Gall-Peters (wikipedia) , AuthaGraph , Winkel-Tripel , List of maps	
9 Wed Feb 25	Taxicab geometry and Axiomatic geometry	Ch. 5, Taxi! (AMS feature column) , Ch. 6	
10 Mon Mar 2	Exam 1		
11 Wed Mar 4	Euclidean geometry: parallel lines, area	Ch. 7.1-7.5	
12 Mon Mar 9	Pythagorean Theorem, geometric algebra	Ch. 7.6, Ch.8, Euclid's proof , gogeometry , Pythagorean triples , squaring a rectangle , scissors congruence	
13 Wed Mar 11	Thales' Theorem and Similarity	Ch. 9, cut-the-knot , Givental	
14 Mon Mar 16	Pythagorean Theorem: other proofs	Student Presentations #2 cut-the-knot , stackexchange , animated dissection proofs	
15 Wed Mar 18	Circles	Ch. 10, Power of a Point Theorem , Eratosthenes	
16 Mon Mar 23	Concurrence in triangles	Ch. 11.1-11.2, GeoGebra Concurrence , Ceva's Theorem	
17 Wed Mar 25	Review		
18 Mon Mar 30	Exam 2		
Apr 1-9	No classes - Spring break		
19 Mon Apr 13	Regular polygons and constructibility	Ch. 11.4-11.5, Ch. 16, Regular pentagon	
20 Wed Apr 15	Euler's formula and regular polyhedra	Regular polyhedra (cut-the-knot) and slides , Euler's formula (AMS feature column) , Givental , Dimensions ch 2 - 4	
21 Mon Apr 20	Isometries, 3-Reflections Theorem	Ch. 15.1-15.3, Applet	
22 Wed April 22	Classification of Euclidean Isometries	Ch. 15.1-15.3, cut-the-knot , Wikipedia	
23 Mon Apr 27	Spherical 3-Reflections Theorem, Hyperbolic plane	Ch. 12, Poincare disk , Escher , Escher gallery , Taimina , soccer , kale	

24 Wed Apr 29	Hyperbolic tessellations	Joyce , Tilings-1 , Tilings-2 , Jos Leys , Series-Wright , Hatch	
25 Mon May 4	Hyperbolic geometry	Ch. 13 Student Presentations #3	
26 Wed May 6	Hyperbolic geometry	Ch. 13 Student Presentations #3	
27 Mon May 11	Inversions, Isometries of hyperbolic plane	Ch. 15.4-15.5, cut-the-knot-1 , cut-the-knot-2 , Cheritat , Jerdonek , Hitchman	
28 Wed May 13	Review for final exam		
Monday May 18	Final exam		

Course Policies

- Attendance is mandatory.
- Cell phone usage of any kind during class and on exams is not allowed.
- Missing the Final exam will result in an F grade. Any changes to the grading policy will be announced in the class.
- You must take the Final exams at the time scheduled by the university.
- Students are not allowed to step out of the classroom during exams, except in case of emergencies.
- **Academic dishonesty:** Cheating in any form will not be tolerated. Please see [CUNY Policy on Academic Integrity](#).
- **Disability policy:** Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the [Center for Student Accessibility](#). Please provide written verification of student's eligibility from the OAS. Prior to granting disability accommodations in this course, the instructor must receive written verification of student's eligibility from the Center for Student Accessibility, which is located in 1P-101. It is the student's responsibility to initiate contact with the Center for Student Accessibility staff and to follow the established procedures for having the accommodation notice sent to the instructor.