Mathematics 120
Fall, 1998

Textbook: Euclid, *Elements,* Books I, VII, VIII, IX. (N.B. Volumes I & II of Heath's translation contain these books. Volume III, which contains Books X–XIII, will not be used at all and was meant to be marked "Recommended." It is for those students who wish to own a complete set.)

Other Materials: Straightedge, compass.

Instructor: Dr. Michael Rogers.
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Hours: M–F 2–3 p.m. Also by appointment.

Course Content: Mathematics 120 is an introduction to pure mathematics through the study of geometry and number theory.

Course Goals: After this course, the student should be able to do the following: to reason ably about geometry and numbers, to understand the elements of two of the classical liberal arts, the geometrica and arithmetica. This course is purely for the purposes of liberal education. Thus its goals are the highest possible in a mathematics course. (One translator of Euclid, Wilhelm Holtzmann known as Xylander, who produced the first German translation in 1562 in which many of the proofs were omitted, tells us that his book was meant for the simple amateur who is of course content to know the facts without knowing how to prove them. But you are not mere amateurs. You are liberal arts students.)

Tests: Two or three tests will be offered. The first is currently scheduled for **Tuesday, September 22** in class. In no case will it be later than September 24. Other tests will be scheduled as it seems appropriate to the instructor. If a student has an excuse deemed legitimate by the instructor, arrangements will be made to take the test **prior to** the scheduled time.

Quizzes: All quizzes are announced; some may be take-home. The student must be present in class to receive a quiz. Take-home quizzes will be due in class on the following class day.

Class Participation: The work done in the class meetings is part of the course work for each student. Absenses and tardiness must be counted as work not done. Further each person is to be ready to participate in each class meeting. Students will be expected to present proofs at the blackboard unaided by notes or the text. Responsibility will rotate in random order throughout the class. A LearnLink conference, "Math 120.1230J", has been created within the "Oxford: Mathematics" conference for this course. Contributions to the LearnLink conference may count toward class participation, but they may not completely replace participation in class.

Commentaries: Commentaries are due each week on **Thursday**, excepting weeks in which there is a test and August 27. Each is to be no more than two pages, typed, double-spaced, of a 12-point font or larger, and at most 750 words. Each is to be a comment on the ideas in the course. Each may provide alternate explanations of things, probe issues which cause the student confusion, or anything which shows serious thought about some part of the course. A comment is more than an off-hand reaction like "It was interesting." A comment is to be deep, critical, insightful, coherent, focused; it is to amplify or clarify the successes or failures of the text. Outside sources are permissible; keep in mind that each commentary will be graded on the quality of the student's own reflections. If outside sources are used, be sure to cite them appropriately and to avoid plagiarism as defined in the Honor Code.

Original Proofs: Propositions will be handed out which the student may attempt to prove. Such proofs are to be worked out by the student alone. The student may refer to the text used in class, any notes handed out in class, and his or her own notes. No one else's notes may be used. Such proofs may be submitted for credit any time on or before Thursday, December 3, 1998.

Final Examination: There will be a comprehensive final examination at the time scheduled by the registrar.

Grades: Grades will be based **roughly** on the following distribution of work:

Tests & Quizzes	40%
Class Participation & Commentaries	30%
Original Proofs	10%
Final Examination	20%

If three tests are given, then the tests will count a slightly larger proportion of the grade.

Course Outline: The course can be view as consisting of three parts, (1) an introduction to geometry, (2) an introduction to number theory, and (3) modern developments of geometry and number theory. For part (1) we will study Book I of the *Elements*. For part (2) we will study Book VII and parts of Books VIII and IX. For part (3) it is proposed that we study Lobachevsky's non-Euclidean geometry and Peano's axiomatic basis for number theory. Each part will occupy roughly an equal amount of time.

Honor Code: The Honor Code of Oxford College applies to all work submitted for credit in this course. All such work will be pledged to be yours and yours alone and to have been done in accordance with the given instructions. This is the case when you place your name on work submitted.