MA-331 (W,07)

Geometry I: Meets MWThF in WS 1705 at 2 p.m.

Instructor: Bob Myers NS1135 Office hours are on my door and on my home page.
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Text: Elementary Geometry from an Advanced Standpoint, 3rd Ed. E. E. Moise

Prerequisites: MA-211 or consent of instructor.

Graded Activities: There will be at least three units, each with a unit score. For each unit, there will be an exam which will usually count about three-quarters of the unit score. There will also possibly be a few quizzes. Finally, there will probably be collected assignments. There will also be opportunities to submit Extra Credit (EC) work. I'll explain in class how the test, quiz, homework and EC points will be used to compute your unit grades.

Your prefinal score will be a weighted average of the unit scores. The final exam will count 20% or 50% of your final grade, whichever is more beneficial for you. (Proviso: for the 50% option to hold, you must take all the exams and you must satisfy the attendance requirement. Also, if you do not take the final exam, the zero you get will count 50% of your grade.) The lower cutoffs for A-'s, B-'s, etc. will be 90%, 80%, etc.

Attendance: Required. You may take at most five unexcused absences.

Content: This course provides a detailed introduction to classical Euclidean geometry and an informal introduction to non-Euclidean geometry. It also includes a study of the axiomatic development of the real number system as an example of many of the concepts and methods used in the study of geometry. The following chapters in Moise will be covered -- though not in the order given and not necessarily in their entirety: 1-7, 9-14, 16, 19, 21, and 23. Here are some of the things I expect you to learn about in this course:

--Geometry as an axiomatic-deductive structure.

--Some logic and some philosophy of mathematics.

--Some new geometric theorems but mainly new, and careful, proofs of familiar theorems.

--A bit of the history of geometry and the role it played in the development of modern mathematics.

Expectations: I'll expect you to know (i.e., memorize) the axioms, definitions and theorems of geometry (and of the real number system) and be able to reproduce (possibly with some assistance) the proofs of most of the major theorems proved in the course. (This is not to be blind memorization. Your goal should be to understand the proofs, in both overview and detail, to such a degree that reproducing a proof is like presenting your solution to a previously solved problem.) You will also be expected to do proof-type problems. Moreover, **you must have an overview** of the material we cover.

I can't emphasize enough how important the things taught in this course are for you as a future mathematician and a teacher of mathematics. Formal definitions and deductive proof are at the very heart of the subject; that's why, in all the texts you've used so far, even in high school, the major ideas were labeled "definition" or "theorem." Usually the theorems were proved in the text and you, the student, were expected to read and understand them. If you were like most of us, however, you probably skipped the proofs (and maybe even the theorems themself); instead, you just looked at the book's examples to see how to do the assigned problems. As student, you may have been able to get by like this but yoy certainly will not as a teacher of the mathematics. Your teaching job will involve giving explanations for things and often those explanations involve proofs. (Or it may be that you'll have to decide that another form of explanation is more appropriate for level of the class your teaching, but you won't be able to make such an informed decision unless you understand the proof you've decided not to give.) In short, understanding, and being able to do, deductive proofs are fundamental components of the discipline that you have chosen as a career. This course will help you develop these competencies.

Notes and Notetaking: In the past, I've provided daily notes for this class and I will do so this semester as well. Often the notes will contain just a brief suggestion of a definition or theorem with a comment that you should get the careful definition from the text. Sometimes I might just sketch a proof in the notes, leaving the details to be done in class or done by you at home. I'd suggest that, in conjunction with the notes and the text, you keep a notebook in which you state carefully the axioms, definitions and theorems for the real numbers and geometry. You should also include your own proofs of the major theorems. How you organize your notebook is up to you.

Studying and Learning: In class, and while studying, you should be an active learner. This means that, for example, in class you should try to anticipate what will come next in my presentation of a definition or a proof. And when you're reading the text, you should cover up the author's proof (or parts of the proof) and try to anticipate what will come next. Obviously, this means drawing your own pictures, restating things in your own words, stating things more precisely (in the case that the statement in the text is imprecise), etc. Once you've understood the author's proof, you should cover it up and try to reproduce the major parts of the proof on your own.

Precision in the use of language and symbols is critical in mathematics. In this course, it is not sufficient just to have "the right idea;" you must also be able to express the idea in precise terms. This comes with practice.

Talking together about things taught in this class is encouraged. However, you cannot rely on your peers to do the most important part of the work on problems, namely understanding what's being asked and getting a solution started. Usually, the hardest part of any problem, be it a proof or a "story problem", is the initial "mucking around" stage where you work at trying to get a clear idea of what you're to do. [How often in calculus, or other courses, have you heard (or even said yourself) "I can't get an equation for this problem. But if I just had an equation, I'd be able to do the math to solve the problem." In fact, the "math" is what's involved in writing an appropriate equation and interpretting the results after you've done the mechanical computations. The mechanical computations, what many people regard as "the math," are only a part of the process.] So before you discuss things with your colleagues, be sure that you, and they, have spent some time alone working on the problems.

For graded problems, you must first work on problems on your own. If you get stuck, I have many office hours that I'll spend with you. Once you get a solution, you may want to discuss it with your colleagues -- but again not until they have spent time themselves on the problem. It goes without saying that **any work that you submit for grading must be written up on your own.** It is useful sometimes to have your colleagues proof-read your work and make suggestions about things like introducing symbols, clarifying your presentation, etc. Obviously, you are expected to proof-read your own work before you turn it in.

One further point. I know that solutions to many of the assigned problems are available from various sources. It will not help your learning if you often consult these sources. And, needless to say, turning in someone else's work as your own is sheer plagarism.

Disabilities: If you have a need for disability related accommodations or services, please inform me or the Office of Student Support and Disability Services at 405 Cohodas (Phone: 227-1550). Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and university guidelines.

Index Card: Please fill out the card with this information: (Answer 8 and 9 on the other side of the card.)

1. Name & E-mail Address
2. Year in school
3. Major
4. Minor
5. Previous college math courses and grades. Which of these did you take at NMU?
6. Do you plan to teach mathematics in high school?
7. If it's not evident from the above, why are you taking this course?

8. Which high school math course did you like the most and which did you like the least? Which college math course like the most and which did you like the least?
9. In which college math course have you been required to do proofs? How do you feel about doing proofs?