

Math 125 – Math for Elementary Teaching
Spring 2006

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Course Materials – Our text is Mathematical Reasoning for Elementary Teachers, 4th ed. by Long and DeTemple. In addition, all students are expected to have a calculator. Almost all schools introduce students to calculators in the early grades, and calculators are used routinely for investigation of properties of numbers, for problem-solving, and for confirmation of hand calculations.

Course Topics and Goals – This course is designed specifically for students who intend to teach in elementary school. Its purpose is to provide the mathematical background necessary for teaching with confidence and imagination the basic concepts of mathematics as well as techniques of problem-solving. Throughout, the emphasis will be on basic ideas, problem-solving, and the larger historical and cultural contexts of mathematics.

The primary goals of this course are to provide a deeper understanding of mathematical concepts, methods of reasoning, and techniques of calculation that are taught in the elementary grades. Specifically, a successful student will be able to:

1. use the mathematical content of this course to model and solve realistic problems;
2. use mathematical reasoning to find patterns, make and test conjectures, and create simple proofs or find counterexamples to prove or disprove these conjectures;
3. communicate results and conjectures using words, tables, symbols, and graphs;
4. make connections between mathematical topics and other areas of mathematics, other disciplines, or situations in daily life;
5. use technology as a tool to help solve problems;
6. use visual and tactile aids (manipulatives) to make mathematical concepts more concrete;
7. work well as part of a team to define, solve, and report on projects.

Evaluation and Grading – Grades will be the result of quizzes, homework, group projects, three exams, and a cumulative final exam. The breakdown is as follows:

Homework and Quizzes – 15%

Culture Points – 5%

Group Projects and Class Participation – 10%

3 Exams – 15% each

Final Exam – 25%

Practice problems and reading will be assigned each day. You are expected to complete these for the next class meeting.

Some assignments will be group work done both in and out of class. Each group member will turn in an individual report based on the work of the entire group. When grading these assignments I will choose **one** report from each group. Every member of the group receives the same grade.

The remainder of the assignments are meant to be individual work. For these assignments you are expected to work on your own. If you have any questions on these you should come to me for help.

Quizzes are meant to help you monitor your progress in the course. They will be based on material from class, readings, and the practice homework problems. There are no make-up quizzes.

We will have three in-class tests during the semester, and a cumulative final. The tentative dates for the tests are **Friday February 10, Wednesday March 1, and Friday March 31**. The final exam will be set by the registrar.

Remember, for every hour in class you should expect to spend 2 hours doing work outside of class. **You cannot learn math without lots of practice!**

Attendance – Regular attendance is vital. If you miss a class you are responsible for finding out what you missed. A late assignment will be graded with a reduction of 20% for each day it is late. There will be no make-up quizzes given, and make-up exams are given only in extreme, pre-approved cases. If you have to miss an exam it is your responsibility to contact me **in advance**.

Disclaimers

- This syllabus is subject to change through the semester. Any updates to the syllabus will be posted on the class web-page.
- If you are in need of special accommodations due to a disability, please contact the Learning Services Office as soon as possible. We can only accommodate your special needs if we are made aware of them.
- All grades given in this class are subject to my qualitative judgment as professor of the course.

Mathematics Department Academic Honesty Policy – The Mathematics Department supports and is governed by the **Academic Honesty Policy of Moravian College** as stated in the Moravian College Student Handbook. The following statements will help clarify the policies of members of the Mathematics Department faculty.

In all at-home assignments which are to be graded, you may use your class notes and any books or library sources. When you use the ideas or thoughts of others, however, you must acknowledge the source. You also may not use a solution manual or the help (orally or in written form) of any individual other than your instructor. If you receive help from anyone other than your instructor or if you fail to reference your sources, you will be violating the **Academic Honesty Policy of Moravian College**. You may work with your fellow students on homework which is not to be graded. You are responsible for understanding and being able to explain the solution of all assigned problems, both graded and un-graded.

All in-class or take-home tests and quizzes are to be completed by you alone without the aid of books, study sheets, or formula sheets unless specifically allowed by your instructor for a particular test.

The purpose of Culture Points

Mathematics is a broad subject – it has grown out of very concrete needs to measure, assess, compute. Over the millennia it has grown both in practical applications and in aesthetic beauty. A mathematician seeks ideas that are both intellectually rigorous and intrinsically elegant.

One of my central goals for this class is to give you some perspective into the nature of mathematics and why it should matter to everyone. To help you get a better sense of what mathematics is, I am asking you to participate in “mathematical cultural awareness.” There are no specific assignments for this portion of the course. Rather, there are many opportunities for you to explore mathematics in our culture. Activities that foster cultural awareness include (but are not limited to): attending talks, discussing a mathematical topic with a fellow student or professor, giving a talk, reading a paper, or solving a problem.

How to get credit

After participating in an event relevant to your mathematical growth, you need to submit a short paper. It should be typed (1.5 line spacing, 12 point font, standard margins), and consist of two parts:

- **Part I** (no more than 150)
Provide a description of the event or activity. For a math talk, article, or conversation, this would mean providing a summary of the material covered. For a solved problem, this would mean a complete solution to the problem.
- **Part II** (no fewer than 75 words)
Explain how the event deepened your understanding or appreciation of mathematics. Some questions to consider here are: Did the activity change the way you think about mathematics? Did the mathematical perspective change the way you think about the topic? Did it confirm any perceptions you might have had of mathematics? What sorts of connections did the mathematics of this event have with your own life or to the current course?

Each event is typically awarded a fixed number of points (see the examples at the right). Depending on the quality of your response (above) you may be awarded more or fewer points for the event.

Rules for submission

- No more than one culture point submission may be made in a 48 hour period. Otherwise you are free to make as many culture point submissions as you wish.
- If your submission is about an event (a TV show, math colloquium, etc.), then I must receive the submission within 10 days of the event in order to give credit.
- If you are submitting a reflection on an article or other reading, then you must provide the complete bibliographic entry for the source. **DO NOT** give me a copy of the source itself.

How to assess a grade

By the end of the semester, you need to have accrued **10 points** to get full credit for this portion of your course grade. Your credit for this portion of the course grade will be based on what percentage of those 10 points you managed to accrue.

Some typical cultural events

The following events provide guide of what sorts of activities might get you credit. If you participate in an activity not listed here that you believe contributed to your understanding/appreciation of geometry, please don't hesitate you write up your summary and hand it in to me.

1. Attend an epsilon-talk (2 points)

While I hope you attend all epsilon-talks, I can give credit for at most 3 of these.

2. Attend a Math/CS colloquium (3 points)
3. Attend the Moravian Student Conference in February (7 points)
4. Review an article on mathematics (2 to 4 points)

Some nice journals to look through are *Scientific American*, the *MAA Monthly*, and the *Mathematical Intelligencer*.

5. Discuss a mathematical topic with someone not in our class (2 points)

This is assuming a single serious mathematical conversation, as opposed to a quick single question and single answer situation.

6. Solve a problem outside the normal scope of the class (2 to 4 points)

Throughout the semester, I will indicate some potential problems for you to work on.

7. Watch and review a movie (e.g.: *A Beautiful Mind*) or television show (e.g.: *Numb3rs*) that tries to present an honest portrayal of mathematics or mathematicians.

As the semester progresses, I will offer some specific opportunities to gain culture points.