

Math 103**Mathematical Ideas**

Spring 2005

Section 103A: Mo, We, Fr, 9:00 to 9:50 am, Glatfelter 302

Section 103B: Mo, We, Fr, 11:00 to 11:50 am, Glatfelter 303

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<http://www.gettysburg.edu/~bdoytchi/math103.html>**Office Hours:** Mo, We, Fr: 1:30 pm to 3:30 pm, Tu 11:15 am to 1:00 pm, and also by appointment.**TEXT:** *Using and Understanding Mathematics: A Quantitative Reasoning Approach*, 3rd Edition, by Jeffrey Bennett and William Briggs. ISBN 0-321-22773-5**CALCULATOR:** A *graphing* calculator is required. You may use whatever graphing calculator you currently own. If you are planning to buy one, it might be advisable to talk to me first.**COURSE CONTENTS.** The course consists of four main parts:

- **Math and Politics** Voting and apportionment.
Chapter 12.
- **Probability and Statistics** Computing probabilities. Law of large numbers. Descriptive statistics. Data distributions. The Normal distribution. Statistical inference.
Chapters 7, 5, 6.
- **Exponential and Linear Models.** Linear and exponential growth. Doubling time and half-life. Population growth. Logarithmic scale. Modeling with linear and exponential functions.
Chapters 8, 9.
- **The Mathematics of Finance.** Compound interest. Saving plans and investments. Loan payments, mortgages.
Chapter 4.

COURSE GOALS. By the end of the semester you should accomplish the following.

- Develop an understanding of major mathematical concepts and of *multiple frameworks* for their analysis: analytical, graphical, numerical, and verbal.
- Learn to *combine alternative methodologies and perspectives* for the investigation of mathematical problems. Accurately and efficiently perform computations, both by hand and with a graphing calculator.
- Be proficient using the mathematical ideas, tools, and techniques to *solve problems*, both novel and familiar.
- Develop *effective communication* skills, and learn to express your mathematical work in a clear, precise, and elegant manner. Apply mathematics as a *language* with which to model the world.

LECTURES. There are three lectures per week, conducted on MWF (see top of this page).

You are supposed to attend all lectures. If you miss a class, it is your responsibility to make a copy of the classnotes from another student and make sure you learn what you have missed.

You are expected to actively participate in class by asking questions, making comments, working on the assignments, and sharing your insights with others.

HOMEWORK. Homework is assigned at every lecture and is a required component of the course. Working the exercises will help you learn, and give you some perspective on your progress. You are encouraged to discuss homework problems with each other, however you must individually write your own solution (see the Honor Code section below). No late or sloppy homework will be accepted.

TESTS, EXAMS, GRADING POLICY.

You can always check your grades via the BlackBoard site <http://courses.gettysburg.edu/>

There will be six in-class tests, on JANUARY 26, FEBRUARY 11, MARCH 2, MARCH 16, APRIL 8, and APRIL 20. There will be a three-hour Final exam. For section A, the final exam will be on May 4, 8:30-11:30am, for section B, the final exam will be on May 6, 1:30-4:30pm.

There will be regular, short, in-class quizzes based on recent homework. No make-up quizzes will be given for any reason. Your lowest three quiz scores will be dropped.

Grades will be determined according to the following table.

Attendance and Participation	10%
Quizzes and Homework	15%
Tests	50%
Final Exam	25%

HONOR CODE. As you already know, Gettysburg College operates under an Honor Code.

On each piece of work you submit for grading, you should write out the Honor Pledge by hand and sign it. The Honor Pledge is as follows: *"I have neither given nor received any unauthorized aid, nor have I witnessed a violation of the Honor Code."*

Every student is responsible for abiding by the provisions of the Honor Code, beginning with the first day of classes.

Here are some specific details about the ways the honor code applies to this course:

1. Homework

- (a) The purpose of the homework is for you to actively engage in learning the methods, techniques, and problem-solving skills in the course.
- (b) It is acceptable (and actually encouraged) to discuss the course material and to work on homework problems with other students. However, each student must individually write up his or her own solutions.
- (c) It is a violation of the Honor Code to copy a homework solution from other people or other sources (such as a solutions manual).
- (d) You are encouraged to check the final results of your problem-solving work by looking at the answers at the back of the textbook. If your final answer is not correct, you should reexamine your calculations and possibly reconsider your approach to solving the problem. Your written solution to any problem should show fully and clearly your work and methods to solve the problem. It is a violation of the Honor Code to simply copy the final answer from the back of the textbook.

2. Tests, Quizzes and Exams

- (a) All quizzes, tests, and exams must be taken in your classroom or in the specific area designated by your instructor.
- (b) All quizzes, tests, and exams are closed-book with no notes available (either in writing or in electronic form).
- (c) Calculation with graphing calculators is permitted, except as designated by the instructor.

3. All Graded Work

- (a) You must write out a complete, honest, and detailed acknowledgement of all assistance you received and all resources you used (including other people) on all written work submitted for a grade. There is no specific format you must use.
- (b) Ask your instructor if you are uncertain. When in doubt, write it out.
- (c) You must write out the Honor Pledge by hand and sign it.

SCHEDULE. The following schedule is tentative. It is expected that we will follow it rather closely, but there will be some minor deviations from time to time.

The table below shows the *written* assignment for each section. There will also be reading assignments announced at the end of each lecture.

Math 103, Mathematical Ideas

SCHEDULE

Day	Date	Topic	Sctn	pages	problems	Due
Th	01/13	Intro				
Fr	01/14	The Nature of Mathematics				
Mo	01/17	Paradoxes of Voting	12A	666-669	15,21,25,29,38	01/19
We	01/19	Some Theory of Voting	12B	676-679	10,13,15,22,35	01/21
Fr	01/21	Apportionment	12C	696-697	13,20,22,24,28	01/24
Mo	01/24	Review				
We	01/26	TEST 1				
Fr	01/28	Fundamentals of Probability	7A	439-441	15,16,21,39,45	01/31
Mo	01/31	Combining Probabilities	7B	452-453	13,18,21,25,27	02/02
We	02/02	The Law of Large Numbers	7C	461-465	12,15,23,36,39	02/04
Fr	02/04	Risk	7D	471-473	12,19,22,26,27	02/07
Mo	02/07	Counting	7E	484-486	24,29,33,44,47	02/09
We	02/09	Review				
Fr	02/11	TEST 2				
Mo	02/14	Fundamentals of Statistics	5A	314-316	28,29,30,42,47	02/16
We	02/16	Features of Statistical Studies	5B	326-328	11,12,19,23,34	02/21
Mo	02/21	Statistical Tables and Graphs	5C	339-342	15,17,18,26,38	02/23
We	02/23	Fancy Graphs in Statistics	5D	355-359	14,17,25,28,29	02/25
Fr	02/25	Correlation and Causality	5E	372-375	13,16,18,26,39	02/28
Mo	02/28	Review				
We	03/02	TEST 3				
Fr	03/04	Data Distributions	6A	388-391	15,20,21,29,35	03/07
Mo	03/07	Measures of Variation	6B	400-401	15,19,21,24,25	03/09
We	03/09	The Normal Distribution	6C	410-412	11,17,19,21,31	03/11
Fr	03/11	Statistical Inference	6D	423-425	16,25,33,39,40	03/14
Mo	03/14	Review				
We	03/16	TEST 4				
Fr	03/18	Linear and Exponential Growth	8A	496-497	9,11,13,22,29	03/30
We	03/30	Doubling Time and Half-life	8B	506-508	36,37,43,51,53	04/01
Fr	04/01	Population Growth	8C	517-518	13,14,17,21,22	04/04
Mo	04/04	Logarithmic Scales	8D	526-528	11,19,21,25,39	04/06
We	04/06	Review				
Fr	04/08	TEST 5				
Mo	04/11	Functions	9A	540-542	20,21,23,34,36	04/13
We	04/13	Linear Modeling	9B	553-556	18,25,31,33,40	04/15
Fr	04/15	Exponential Modeling	9C	569-572	30,39,41,43,47	04/18
Mo	04/18	Review				
We	04/20	TEST 6				
Fr	04/22	Compounding	4A	224-227	33,36,41,46,61	04/25
Mo	04/25	Savings and Investments	4B	246-250	40,44,48,83,84	04/27
We	04/27	Loans, Credit, Mortgages	4C	264-268	15,18,41,49,51	04/29
Fr	04/29	Review				
We	05/04	FINAL EXAM, Section A, 8:30-11:30am				
Fr	05/06	FINAL EXAM, Section B, 1:30-4:30pm				