

# MA120A – Finite Mathematics

Rivier College, Spring 2006,

MWF 8:30AM- 9:20AM in STH 230 & 135

## Instructor

bill bonnice

Office location: Regis, top floor

Home phone: 603-888-4807

Office phone: 603-897-8540

Home e-mail: [cf1bb@aol.com](mailto:cf1bb@aol.com)

E-mail: [wbonnice@rivier.edu](mailto:wbonnice@rivier.edu)

**Office hours:** Please let me know whenever you need help. Many ideas in this class will be new to you and you will need to study them beyond the classroom in order to understand them fully. You are invited to stop by my office whenever I am there or make an appointment for a different time. I will also respond to e-mail questions. My scheduled office hours are:

**MWF 9:30 – 11:00 in STH 230, Thursday 5:30 – 6:30 in Mem 101**, and by appt.(Feel free to call me at home or at my office.). **Note:** I have office hours immediately after every class if any would like to talk with me then.

**Textbook:** *Finite Mathematics*(6<sup>th</sup> Edition, 2002) by Howard L. Rolf, Brooks/Cole(Thompson Learning), ISBN: 0-534-46539-0.

**Use of Excel or Graphing Calculator is Required:.** We will have some of our classes in the STH 135 Computer Lab where we will learn how to use those parts of Excel that will be helpful in this course. Also, although not essential, a graphing calculator with a table function will be helpful for this course. It will be possible to do all the problems without a graphing calculator, but many of the required computations will be very tedious to do by hand and, due to the nature of the computations, unless you are extremely careful, you will be apt to make mistakes. Usually Excel will also be able to do the things that a graphing calculator can do.

The overhead projector calculator which I will use sometimes in class will be a TI-83. TI-82's and TI-83's are easy to use and are programmable. TI-85's and TI-86's are acceptable but slightly more complex. They do have better statistical capabilities (not needed for Finite Math) than the 82/83 versions. If you own a brand other than TI, you are welcome to use it, but I will not be familiar with the commands. Particularly, in this case, make sure you have a manual for the calculator so that I can read it in order to try to help you.

## **Brief course description:**

Includes inequalities, systems of linear equations, matrices, applications of matrix algebra, linear programming, set theory, counting principles, probability, and an introduction to statistics.

## **Prerequisites**

The prerequisite is 2–3 years of high-school mathematics (including 2 years of algebra and one year of geometry) or Math112, College Algebra.

## **Course Objectives:**

- Enhance students' understanding of the modeling process and how mathematics is used in real world applications.
- Provide some of the mathematics background necessary for students in business, management, or the life or social sciences.
- Provide students with geometric and algebraic ways of understanding and solving linear programming problems.
- Investigate probabilistic models and solution processes.
- Learn mathematical concepts and techniques from the textbook, from homework, and from classroom activities.
- Work on learning activities in collaboration with other students in the class.
- Be able to communicate your work effectively.

You are expected to participate in class. You should read the book and be prepared to ask questions about the reading and the problem assignments, and take part in class discussions and problem solving.

### **Peer Study Groups:**

Class activities will complement, not substitute, for the reading, problem solving, and discussion that you engage in outside of class. Studies over a long period at Harvard (See *Making the Most of College* by Richard Light, Harvard U. Press, 2001) have shown that one of the two main things that make for the most success in college is the formation of peer study groups which meet weekly. Thus every student in this class will be expected to be part of a study group which meets weekly. I will expect you to form your own groups and will ask you to list your group members and state the place and time of your weekly meetings.

### **Homework:**

In their Self-Evaluations often students tell me that they spend at least an hour outside of class doing homework. The implication is that they think that that is enough. A rule of thumb is that you should spend at least two hours out of class for each hour in class. So plan to spend 6-8 hours per week in study and doing assignments for this course outside of class. As explained in the previous section, you are encouraged to study together, but be sure you do as much explaining as your partners do. You will know that you have learned a concept when you are able to reproduce reasoning and solutions developed during a conversation. Regular study as well as regular attendance in class is very important to your success in the course.

### **Reading**

Reading technical material is a very valuable skill that you will need in this course and in other courses that you take. One of the goals of this class is that you become comfortable reading mathematical material. Toward this aim, I expect that, before each class, you read the textbook sections that we will be covering in class. Reading mathematics can be difficult. As you read through your Finite Math textbook, follow these:

### ***Guidelines for Reading a Math Textbook***

Reading a mathematics textbook is a skill that you can learn. As the semester progresses, you should be able to read more effectively. Here are some suggestions:

- **Spend Time:** Spend time for each reading assignment. It is not unusual to spend up to an hour for each reading assignment.
- **Read and Re-read:** A mathematics text is not easy to read. You might not understand it your first time through. Read in preparation for class. Re-read after class. Re-re-read when doing homework assignments. Things should become clearer each time you look at material in the text.
- **Learn the Language:** Make sure that you understand the terminology, the keywords, the definitions. When you encounter a word that you don't understand or whose definition you have forgotten, look it up in the index. Reread the section where the word is defined and used.
- **Don't Just Read - Do!:** Read with paper and pencil in hand. Read the statement of an example in the book. Then cover up the book's solution and try to do it yourself. After your attempt, look at the book's solution. When you think you understand the book's solution, try again to do the problem.
- **Follow the Instructions:** Sometimes the book will ask you to check calculations or graph an expression. Do it! Let the text step you through the material.
- **Reflect:** Reflect on what you have read. While you are reading try to determine the main concept in the section or the chapter. How does the new material fit in with what you've already learned? Where do you think it is going? (based on material from Tommy Ratliff at Wheaton College, MA)

### **Problem Assignments**

The assignments and their due dates accompany this syllabus. **Staple loose homework pages together.** If homework is handwritten, it must be neat, and easy to read. One of the objectives for this course is to be able

to communicate your work to others. Handing in homework that is neat and easy to read is a form of communication. Follow the following suggestions:

## **Math Homework Guidelines**

An important skill that you should learn in college is how to communicate. In math classes, you should learn to communicate mathematics.

As a starting point, I want you to communicate your homework solutions clearly and effectively. Here are some suggestions:

- **Identify yourself:** Remember to put your name on top of your paper
- **Identify the assignment:** Write the page, the section number, and the homework assignment number, clearly at the top of the paper.
- **Now what was that problem?** Rewrite the gist of the question or problem as well as the solution. I will not always have a book with me when I look at your homework. So, it isn't very helpful to know only that I am looking at problem #32. I need to know what was asked in problem #32.
- **Neatness is Nice:** Homework must be *neat*, and easy to read. You are not *communicating* mathematics if your writing is illegible.
- **Where's that problem?** Don't make someone hunt around your pages to find your solutions. Clearly identify the beginning and end of each problem.
- **Explain:** Do not be afraid to use words in your homework assignments. In fact, words are highly encouraged. Complete sentences are highly regarded. Justify and explain your arguments. *A list of answers or a string of expressions without any explanation is not acceptable.*
- **Write with your peers in mind:** Write your solutions so that any other student in the class could read and understand your solution. Always keep in mind that your intended audience is other students, not your professor ! One of your goals in this class is to be able to *explain* your work to others. Do not be afraid to use words in your homework assignments. In fact, words are highly encouraged. Even though only some questions will explicitly ask for an explanation, I encourage you to give explanations for all problem solutions.

You should study together, but you should write up your homework solutions on your own, without looking at the work of others. Only then will you be sure that you have understood the material and are able to communicate the material to others.

I will try to return homework by the next class period. I will look to see that you have completed the homework, and I will spot check some selected problems more carefully.

### **Homework Advice**

The homework assignments given are a reasonable sample of the kinds of problems you should be able to do. You should work the assigned problems as soon as possible after each class. I suggest that you do problems in addition to those assigned. You should *not* leave homework until 1 a.m. the night before it is due!

### **Turning in Homework**

Homework assignments are due at the *beginning* of class and should be put into the pink plastic "homework case" on entering the classroom. I encourage you to ask questions *before* the due date. Questions that you have on the homework that you turned in at the beginning of class should be written on a separate piece of paper so that you will remember what you want to ask.

**Quizzes and Tests:** There will be three quizzes, a take-home mid-term and a comprehensive final. The dates and required material for the quizzes are listed on the accompanying schedule of assigned problems.

I may make arrangements with you to make up a quiz in case of an emergency ( being unprepared is not considered an emergency). Any arrangements should be made with me *prior* to the test. In case of a last minute emergency, contact me by phone or e-mail at your first opportunity. *Arrangements for a make-up must be made before the next class.*

## Help

I really like this course and I like to talk about it. I expect that you will have questions on the text material and on homework and I do want to help you learn the material. So please feel free to ask me questions. You can e-mail questions to me. I have office hours when you can just drop in. You can set up a meeting with me at other times. Please come by with your questions.

In addition, let me know if you find the course material too easy, or too difficult, if the pace of the course is too slow or too fast, or if the course is not what you expected. I will try to help you work out a solution to make the course much more profitable and enjoyable to you.

## Computation

### Of Grades

The weights in determining the final grade are as follows:

Homework assignments 20 %

Three Quizzes 30 %

Take-home Mid-term 15 %

Cumulative Final examination 15 %

Project (5 %) and Presentation (5 %) 10%

Miscellaneous(Group Participation; Class Discussion; Write-ups, Other Activities) 5 %

Self-evaluation at the end of the semester ( See final page.) 5 %

**NOTE:** The **final exam** will be cumulative and will be 8:00 – 10:00 AM on Wed., May 3.

Grades are intended to reflect the degree to which the mathematical content has been mastered, not the performance of one student in relation to others. I want my students to help one another learn. I don't want them competing with one another for grades. Instead, the goal is to lift everyone's level of understanding so that everyone can get a high grade. To foster cooperation, I never "scale" grades. I use the Rivier College standard grade boundaries to assign grades:

	87-89 B+	77-79 C+	67-69 D+
93-100 A	83-86 B	73-76 C	63-66 D
90-92 A-	80-82 B-	70-72 C-	00-62 F

These grade boundaries will not be changed. I would be very happy if everyone earned an A.

**Attendance Factor:** Before assigning the final grade, the score based on the above percentages will be multiplied by an attendance factor. Each student's attendance factor starts out as 1.03, but for each absence one percentage point (0.01) will be subtracted from this factor. Arriving up to 30 minutes late will count as half an absence. A student who is present but inattentive may also be penalized. A student with a 78 average who never misses a class would receive  $(78)(1.03)=80.34$ , a B-, while another student with a 78 average and 11 absences, would receive  $(78)(.92)=71.76$ , a C-.

## **GRADING OF THE HOMEWORK:**

I will not have time to grade each problem individually. Instead I will be checking that you have done the homework. I will rely on you to check your own work. If you are not sure of your solution, write down *specifically* what you are not sure about and ask about it in class. I will get an overall impression of each assignment that you turn in and aware it a check plus(110%), a check(100%), a check minus(80%), or a check minus minus(60%). **You can get full credit for any problem that you can't do, by asking a**

**specific question whose answer will help you solve the problem.** There will be no credit given for late homework. It is important to keep up with your work.

**Americans with Disabilities Act (ADA):** Rivier College wants to provide reasonable accommodations to students with disabilities. To accomplish this goal effectively and to ensure the best use of our resources, the College expects students to provide timely notice of a disability to the Office of Special Services for verification and for evaluation of available options. Any student whose disabilities fall within ADA should inform the instructor within the first two weeks of the term of any special needs or equipment necessary to accomplish the requirements for the course. To obtain current information on this procedure, contact the Office of Special Services at telephone extension 8497.

**NOTE:** You are responsible for understanding and complying with the contents of this syllabus. If you have any questions about this syllabus please raise them at any time during the semester.

**MA120A – Finite Mathematics(6<sup>th</sup> Edition) by Howard L. Rolf (ISBN:0-534-46539-0)**

**DAILY DOZEN**

<u>TOPIC</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>EXER- CISES</u>	<u>ASMT. #</u>	<u>DATE DUE</u>
Solving Linear Equations	Appendix A.2	746	1, 7, 9, 13, 17, 20	#1	F1/20
Linear Ineqs. & Interval Notat.	Appendix A.4	754	1,13, 17, 26,30, 31		
Functions	1.1	6	1,2,3,5,7,9,11,13,19,23,27,31	#2	M1/23
<b>Using Your TI – 83</b>	<b>p.11 / #5</b>	<b>Using EXCEL</b>	<b>p. 12 / #10</b>		
Graphs and Lines	1.2	28	11,19,23,49,53,59,71,84,86	#3	W1/25
<b>Using Your TI – 83</b>	<b>p. 35 / # 9, 11</b>	<b>Using EXCEL</b>	<b>p.36 / #5, p.37 / #2</b>		
Mathematical Models and Applies.	1.3	46	1,5,9,13,15,17,21,25,27,28	#4	F1/27
<b>Using Your TI – 83</b>	<b>p. 52 / # 5</b>	<b>Using EXCEL</b>	<b>p. 55 / # 6</b>		
Systems of 2 Eqs.	2.1	72	13,17,29,31,35,41,43,49	#5	M1/30
<b>Chapter 1 Review Exercises</b>		<b>55</b>	<b>1,5,15,24</b>		
Matrix Rep'n of Systems with 3 Variables	2.2	90	5,11,15,21,31,42,54,59	#6	W2/1
<b>Chapter 1 Review Exercises</b>		<b>56</b>	<b>27,29,31,33</b>		
<b>Quiz #1</b>				<b>F 2/ 3</b>	
<b><u>On A.1,A.2,A.3,A.4, &amp; Ch. 1. Anyone who gets &lt; 60 will be required to go to the Math Dept. tutor at least 1 hr a wk</u></b>					
Gauss-Jordan Method	2.3	112	15,27,29,33,43,51,55,63	#7	M2/6
<b>Using Your TI – 83</b>	<b>p. 118 / #1</b>	<b>Using EXCEL</b>	<b>p. 120 / #1</b>		
Matrix Operations	2.4	126	1,3,31,35,37,39,41,43,47	#8	W2/8
<b>Using Your TI – 83</b>	<b>p. 131 / #1</b>	<b>Using EXCEL</b>	<b>p. 132 / # 1</b>		
Multiplication of Matrices	2.5	142	7,13,17,22,23,28,31,33,35,55	#9	F2/10
<b>Using Your TI – 83</b>	<b>p.150 / #3, 4</b>	<b>Using EXCEL</b>	<b>p. 151 / # 1</b>		
Inverse of a Matrix (We're omitting §2.7,2.8)	2.6	161	1,3,9,13,17,28,34,37,41,45	#10	M2/13
<b>Using Your TI – 83</b>	<b>p. 166 / #1</b>	<b>Using EXCEL</b>	<b>p. 167 / # 1</b>		
Linear Inequalities in 2 Variables	3.1	202	1,3,7,11,21,25,26,31	#11	W2/15
<b>Chapter 2 Review Exercises</b>		<b>192</b>	<b>7, 9, 17, 21, 35</b>		
Sols. of Systems of Inequalities	3.2	210	1,3,5,18, 27,30,31,34	#12	F2/17
<b>Using Your TI – 83</b>	<b>p. 214 / #1</b>	<b>Using EXCEL</b>	<b>p. 216 / # 1</b>		
<b>Chapter 2 Review Exercises</b>		<b>193</b>	<b>23, 24, 24, 29, 39</b>		
Linear Programming, a Geomc. Approach	3.3	231	1,3,7,11,18, 27,33,39,69,70	#13	M2/20
<b>Chapter 2 Review Exercises</b>		<b>193</b>	<b>31, 33, 41, 45</b>		
<b>Quiz #2</b>				<b>W2/22</b>	
<b><u>On Ch. 2. Anyone who gets &lt; 60 will be required to go to the Math Dept. tutor at least 1 hr. a week</u></b>					
Applications	3.4	243	1, 3, 6, 9, 11, 13, 14	#14	F2/24
Sets	6.1	409	1,2,12,21ab,22, 43,59,66,70-74	#15	M2/27
<b>Chapter 3 Review Exercises</b>		<b>247</b>	<b>1, 3</b>		
Counting using a Venn Diagram	6.2	415	1,5,6,9,11,13,17,19,20,23	#16	W3/1
<b>Chapter 3 Review Exercises</b>		<b>247</b>	<b>5, 9</b>		
<b><u>Pass out TAKE-HOME MID-TERM EXAM due at beginning of class on Mon., March 27</u></b>					
Basic Counting Principles	6.3	426	1,5,8,13,19, 25,31,38,45,46	#17	F3/3
<b>Chapter 3 Review Exercises</b>		<b>247</b>	<b>11, 13,15</b>		
<b><u>WINTER BREAK Sat., March 4 – Sun., March 12</u></b>					
Permutations	6.4	437	15,16,21,25,30, 37,38,50,61	#18	M3/13
<b>Using Your TI – 83</b>	<b>p. 440 / #1</b>	<b>Using EXCEL</b>	<b>p. 440 / # 1</b>		
<b>Chapter 3 Review Exercises</b>		<b>248</b>	<b>17, 18, 19</b>		
Combinations	6.5	450	8,12,13,23,25, 27,29,33,37,41,57	#19	W3/15
<b>Using Your TI – 83</b>	<b>p. 454 / #1</b>	<b>Using EXCEL</b>	<b>p. 455 / # 1</b>		
<b>Chapter 3 Review Exercises</b>		<b>248</b>	<b>20, 21</b>		
Intro. to Probability	7.1	482	1,3,5,7,11,14,15,19,25,26,31	#20	F3/17
<b>Chapter 6 Review Exercises</b>		<b>468</b>	<b>1, 2, 3, 5, 7, 9</b>		
Equally Likely Events	7.2	491	1,4,5,8,12,13, 16,18,19,21,40,49	#21	M3/20
<b>Chapter 6 Review Exercises</b>		<b>468</b>	<b>13, 15, 17</b>		
Compound Events:Union,Inrscn.,Complement	7.3	504	3,5,6,11,13,16, 21,30,33,36,45,55	#22	W3/22
<b>Chapter 6 Review Exercises</b>		<b>468</b>	<b>18, 19, 21</b>		
Conditional Probabilty (MID-TERM due Mon.)	7.4	517	1,4,9,11,18,19, 24,27,31,35,39,52	#23	F3/24
<b>Chapter 6 Review Exercises</b>		<b>468</b>	<b>23, 29, 30</b>		

<u>TOPIC</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>EXER- CISES</u>	<u>ASMT. #</u>	<u>DATE DUE</u>
Independent Events (MID-TERM due)	7.5	535	1,3,5,11,13,15, 17,19,25,28,33,40	#24	M3/27
<b>Chapter 6 Review Exercises</b>		<b>468</b>	<b>33, 42, 45</b>		
Frequency Distributions (ASN. PROJECT, due F4/21)	8.1	p. 582	1,3,5,7,9,12, 13,15,19,20,22	#25	W3/29
Using Your TI – 83: p. 586, do the given Example			Using EXCEL p. 600 / # 1		
<b>Chapter 7 Review Exercises</b>		<b>566</b>	<b>1, 2, 3, 4</b>		
Measures of Central Tendency	8.2	595	9,13,15,17,21,23, 27,30,32,33,39,40	#26	F3/31
Using Your TI – 83: p. 600 / #3, 5			Using EXCEL: p. 589 / # 1, 3		
<b>Chapter 7 Review Exercises</b>		<b>566</b>	<b>5, 6, 7, 10</b>		
Meas. of Dispersion: Range, Variance, Std. Dev.	§8.3	<b>610</b>	1,7,11,13,15,18, 19,20,21,25,28,37	#27	M4/3
Using Your TI – 83: p. 616, Exrs. #1, 3; Boxplots #1, 2			Using EXCEL: p. 617 / # 1, 3		
<b>Chapter 7 Review Exercises</b>		<b>567</b>	<b>11,12,13, 14</b>		
Pby. Distribs. of Discrete Random Variables	§8.4	<b>p. 623</b>	1,3,5,7,9,15, 18,21,25,27,31,39	#28	W4/5
<b>Chapter 7 Review Exercises</b>		<b>567</b>	<b>15,16,17, 18</b>		
Expected Value of a Random Variable	§8.5	<b>p. 632</b>	1,6,7,9,12,15, 16,19,23,24,35,43	#29	F4/7
<b>Chapter 7 Review Exercises</b>		<b>566</b>	<b>19, 21, 24, 25</b>		
Binomial Distribution	§8.6	<b>p. 644</b>	7,13,16,19,26,28, 31,34,39,47,49,52	#30	M4/10
Using Your TI – 83: p. 616 / #1, p. 650 / # 1					
<b>Chapter 7 Review Exercises</b>		<b>566</b>	<b>26, 30, 33,35</b>		
Normal Distribution ( I )	§8.7	<b>p. 674</b>	1,3,7,15,23,35, 43,47,51,69,97,99	#31	W4/12
Using Your TI – 83: p. 679 / # 1, 3			Using EXCEL: p. 680 / # 1, 3		
<i>Easter Break Thursday, April 13 thru Monday, April 17</i>					
<b>Quiz #3</b>					<b>W 4/19</b>
<b>On Ch. 6 &amp; 7. Anyone who gets &lt; 60 will be required to go to the Math Dept. tutor at least 1 hr. a week</b>					
Normal Distribution ( II ) (PROJ. DUE)	§8.7	<b>p. 674</b>	75,79,83,87,89,91, 93,95,101,107,108	#32	F4/21
Estimating Bounds on a Proportion	§ 8.8	<b>p. 691</b>	1,2,5,9,13,15, 17,19,21,23,29	#33	M4/24
<b>Chapter 1 Review Exercises</b>		<b>p. 55</b>	4,6,8,14,16,30	#34	W4/26
<b>Chapter 2 Review Exercises</b>		<b>p. 192</b>	2,4,10,24,30,40		
<b>Chapter 3 Review Exercises</b>		<b>p. 247</b>	2,6,8,14,16,20		
<b>Chapter 6 Review Exercises ( Self-vals. due)</b>		<b>p. 468</b>	8,10,12,14,16, 20,24,26,42,48	#35	F 4/28
<b>Chapter 7 Review Exercises</b>		<b>p. 566</b>	2,4,6,8,12, 14,16,18,22,24		
<b>Chapter 8 Review Exercises</b>		<b>p. 694</b>	5,8,10,12,16,19, 22,25,27,29,31,32	#36	M5/1

NOTE: The **final exam** will be cumulative, and will be 8:00 – 10:00 AM on Wed., May 3, 2006

**MA 120 Self-evaluation** (due at the beginning of class on Friday, April 27)

This Self-evaluation will count as 5 per cent of your grade. You will be scored on the quality of how you evaluate yourself, how you evaluate your work in this course and how you evaluate your progress and understanding in this course. In other words you could say that you deserve a low grade in the course and give good reasons for that and receive maximum credit on this Self-evaluation.

On the other hand, you could say that you deserve an “A” in the course and receive a low score on the Self-evaluation because you did a poor job justifying your claim for an “A”.

1) **Note:** Grades are based on understanding, progress and achievement, not on effort. It usually takes a lot of effort to achieve understanding and progress but effort alone, without achievement, understanding, and progress, does not warrant a good grade. See 6) below.

In addition to stating what grade you think you deserve in the course, along with justification, you should evaluate yourself on the following:

- 2) How well did I work with my classmates in and out of class?
- 3) How much did I work outside of class and how was the quality of that work? Did I study the text thoroughly with a pencil and paper at hand to try to work out examples before reading them and to work out things I didn't understand? Did I write down questions to be answered in class? How well did I do on the homework and how much time did I put in on it? What was the quality of my effort?
- 4) **QUIZZES:** How did I do on them? How well did I prepare for them? After receiving them back, did I consult with my classmates about them and compare my answers with theirs? Wherever I made a mistake, did I either figure out my mistake or check with others or the instructor until I understood where I went wrong?
- 5) **IN-CLASS PARTICIPATION AND BOARD WORK:** Did I go to the board regularly and explain what I did there? Did I ask questions in class? How much did I contribute to class discussions?
- 6) **UNDERSTANDING, PROGRESS, and ACHIEVEMENT:** How much did I learn and understand in this course? Did I meet my expectations? How much progress did I make? (Compare where you are now to where you were at the beginning of the course. Has there been much change?) What have you achieved in this course?
- 7) **CRITIQUE OF THE PROFESSOR:** What did you like least about my teaching? What did you like most? Suggest at least one thing that I could do to improve my teaching.
- 8) **CRITIQUE OF THE COURSE:** What did you like least about the **course**? What did you like most? Suggest at least one thing that could be done to improve the course.
- 9) **CRITIQUE OF THE TEXT:**
- 10) **MISCELLANEOUS:** Say anything else you'd like to say.