

MA165 – CALCULUS I

Rivier College - Fall 2006 MWF am for 1 hr. and 15 min.

Instructor

bil bonnice

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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:

M 2:00 – 5:00, W 12:30 – 2:00 and by appt.(Feel free to call me at home or at my office.).

Text: *Single Variable Calculus, fourth edition* by Hughes-Hallett, Gleason, McCallum, et al.

Brief course description: Calculus is the study of change and motion. After a quick review of the major types of basic functions, students will explore, analyze, and apply the mathematical concepts of limit, continuity, and derivative. A brief introduction to integration will be included at the end of the semester. We will use the rule of four, studying the subject from graphical, analytical, numerical, and verbal viewpoints.

Required Course Materials: : A graphical calculator with a table function. The overhead projector calculator 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 and higher are acceptable but slightly more complex. They do have better statistical capabilities (not needed for Calculus) than the 82/83 versions. If you own a brand other than TI, you are welcome to use it, but the instructor will not be familiar with the commands. Particularly in this case, make sure you have a manual for the calculator.

Course Objectives:

- To help students understand and appreciate the major concepts of differential calculus
- To engage students in mathematical reasoning
- To develop students' abilities to approach calculus topics from graphical, numerical, and symbolic points of view
- To help students learn to read mathematics and to become independent learners of mathematics
- To develop students' abilities to create mathematical models and use these models to solve problems
- To engage students in the solution of problems, especially open-ended problems, that apply the derivative concept
- To develop students' ability to write about mathematical ideas and problem solutions
- To help students learn the basic algebraic techniques of differentiation and integration.

Teaching Strategies:

- Students read material before it is presented in class and give examples of definitions using actual numbers.
- Presentation of examples and strategies
- Large and small group discussions, and activities
- Students read and write about the text and course material
- Practice and learning through homework assignments
- Applications to demonstrate relevance and extend learning
- Active student engagement in group work and discussions
- Quizzes, and tests to encourage and monitor learning

All students are encouraged to interact with one another and the instructor by asking questions and contributing ideas.

Course Requirements:

- Regular attendance in class
- Homework to be ready to turn in at the beginning of each class
- Active participation and engagement in full-class, small-group, and individual activities
- Writing assignments
- Quizzes, mid-term test, and final examination

Classroom Policies:

- Active participation requires attendance and arrival to class in time to be prepared for work when the class period begins. Students arriving late on the day of a quiz or test will not be given extra time.
- Respect your classmates as well as your instructor. Discussion in class will pertain to the topic of the course. All students have a right and responsibility to ask questions and give insight related to the understanding of course content. Students having a large number of questions should consult the instructor outside of class.
- Participation in large and small group discussions is required and assessed for active engagement and contribution.
- The time spent on this course outside of class should average six to twelve hours per week. This includes reading the textbook, reviewing class notes, doing assigned work, working on projects, and preparing for tests.

- All work turned in on tests, quizzes, and individual papers must be entirely your own. Behavior contrary to this will result in a grade of F on the assignment. On homework, acknowledge any ideas you received from others. Students should be aware of and adhere to the college's policy on plagiarism.
- You are encouraged to study together outside of class. The work you turn in should be entirely your own, though. If you receive help in completing the homework, make sure you put away any notes, write the answer in your own words, and give credit to your collaborators.
- Attendance will be taken each class period. You are expected to attend all classes. If you miss class, you are responsible for doing all classroom activities you missed, getting the notes from a classmate, and turning in all work on the day it is due. If you miss more than two classes, you must meet with the professor to discuss the advisability of your remaining in the course for the remainder of the semester. See attendance factor below.
- If unforeseen and unavoidable circumstances keep you from attending class on the day of a test, you must contact the instructor immediately to explain the absence and, if approved, schedule a make-up. Documentation of the reason for absence and promptness in arranging a make-up is mandatory.

Guidelines for group work:

1. Every group member has the right and responsibility to contribute to the group's work. All members of the group are to be respected and listened to. If you find that you tend to dominate the group discussion, make an extra effort to enable and encourage other group members to participate. If the work is to be submitted, make sure there is a copy (preferably more than one) in class on the day it is due.
2. Share your ideas with others. You'll be surprised to find out how often your ideas will help lead to a right answer! No idea or question is stupid.
3. Arrive prepared and ready to start. When discussing homework in a group, be sure to try all problems in advance and identify where you have questions.
4. During an in-class activity, do not ask the instructor for assistance until everyone in the group has the same question.
5. Take responsibility for your own learning. Share your strategies/questions with the aim of having others understand what you are getting at and where/why you are stuck. This is different from "I couldn't get ..." and expecting another student to show you their answer.
6. Avoid taking responsibility for someone else's learning (since they will not learn). Listen to others with the aim of understanding their strategies and questions. This is more beneficial (and harder) than just showing them how to do it your way.
7. Even when there are no questions, spend some group time sharing resolutions. It feels great to show something amazing you've come up with or to share in someone else's solution. Take some time to enjoy these moments.
8. Have fun, but stick to task.

Mathematics is not a spectator sport. Just as one doesn't become a great athlete by watching games, one can't develop the skill of mathematics by watching the teacher. Give it a try! Take a break and come back to work at it some more. With practice and hard work will come understanding. You'll be amazed at what you can accomplish! Be sure to come see me whenever you need a little coaching or pep talk. I'm here for you!

Homework assignments:

- Before attempting the exercises, the section of the text covering any assignment should be studied with pencil and paper at your side.
- Questions arising from homework should be written down and brought to class.
- Homework should be ready to be collected at the beginning of each class.
- No late homework will be accepted.
- It is essential that homework assignments be done regularly so that performance in the course will not be compromised. The study of mathematics requires regular work, plenty of practice, neatness and precision. Postponed homework or sloppy work usually results in poor comprehension and performance. A rule of thumb is that a student should spend at least two hours outside of class working on a subject for every one hour spent in class. **THIS MEANS THAT YOU WILL BE EXPECTED TO SPEND AT LEAST 8 HOURS A WEEK ON THIS COURSE OUTSIDE OF CLASS.** Actually, if math is difficult for you, you may need to spend more than this, but if you do, it should pay off. Most students can do very well in math if they work at it, and if they keep believing that they can do it.

Assessment: There will be three quizzes. (If you are going to miss a quiz, the instructor **must** be notified ahead of time. Use the phone or e-mail for last minute happenings. Arrangements for a make-up must be made **before** the next class.) There will be one take-home test and a final exam. Class participation is measured by attendance and participation in class. All homework, quizzes and tests must be written neatly.

**Computation
Of Grades**

The final grade for the course will be based upon the quizzes, tests, written assignments, class participation, homework and the final exam in the following way:

Homework	20 %
3 Quizzes	30 %
Mid-term take-home test (Due Mon. 11/6)	15 %
Projects	10%
Cumulative Final examination	15 %
Self-evaluation at the end of the semester due W 12/6	5 %
Class participation	5 %

I want the students in my classes NOT to be competitors but to cooperate to help one another learn. 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+	These grade boundaries will not be changed. I would be very happy if everyone earned an A.
93-100 A	83-86 B	73-76 C	63-66 D	
90-92 A-	80-82 B-	70-72 C-	00-62 F	

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 on work and 11 absences, would receive $(78)(.92)=71.76$, a C-.

Statement on Attendance:

The classroom is the heart of the educational experience at Rivier College because it provides, uniquely, a formal setting for the important exchanges among faculty and students. Regular and punctual attendance at all classes, essential for maximum academic achievement, is a major responsibility of Rivier College students. Failure to attend and contribute to the classroom environment significantly and demonstrably reduces the quality of the educational experience for everyone in the classroom. As a result, absences almost always impact quality performance.

As part of its commitment to a quality educational experience for all members of the Rivier community, the College formally requires specific attendance policies to be developed by its professors and reviewed by their Chair and Dean. Any form of attendance used by an individual professor as a criterion for evaluation must be specified in the course syllabus and presented to students during the first week of classes. These policies may include reasonable penalties and sanctions for excessive absences.

In the event of prolonged illness, accident, or similar emergency, it is the responsibility of the student to notify both the professor and the Office of the Dean. Students must remember that it is always their responsibility to make up the work they have missed during an absence from class. Students are directed to confer with their professors when their absences jeopardize satisfactory progress. Whenever a professor is absent without notification, students are expected to wait fifteen minutes before leaving and to sign an Attendance List, which a class member delivers to the Office of the Dean.

Instructors are required to record attendance and alert the Registrar when a student fails to attend the equivalent of two consecutive weeks of courses (2 absences for a course meeting once a week, 4 absences for a course meeting twice a week, 6 absences for a course meeting three times a week). The student will then be alerted that he/she is in danger of falling under the “habitual non-attendance” policy” (see below).

Habitual Non-Attendance Policy:

Habitual non-attendance of a course or courses will be considered academic misconduct subject to withdrawal from the course(s) not attended. Habitual non-attendance is defined as an absence in any course (for any reason whatsoever) equating to three full weeks of missed class sessions (3 absences for a course meeting once a week, 6 absences for a course meeting twice a week, 9 absences for a course meeting three times a week).

It is the responsibility of the student to notify the College of any intention to withdraw from a course or withdraw from the College. The College will attempt to resolve the issue of habitual non-attendance with the student; however, the College reserves the right to withdraw students who are no longer attending courses. Habitual non-attendance in one or more classes may result in administrative withdrawal from the class or classes affected withdrawal from the College or, in cases with extenuating circumstances, an administrative leave of absence. In such cases a grade of W or NF will be assigned to the classes affected according to the appropriate date published in the academic calendar.

Students who have attended no class sessions of a course or courses from which they are registered by the end of the drop/add period will be dropped from each class not attended. If a student never attended any courses during the drop/add period, the student will be withdrawn from his/her full schedule of courses.

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 with the answers in the back of the book or by checking with me, the Math Dept. tutors, or your fellow students. Also, 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 award 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.

COOPERATION IS THE NAME OF THE GAME:

We're all here to learn and we'll learn easier and have more fun if we all work together to help one another learn.

I expect you to relate to one another as mutual helpers rather than competitors. I'd like all students in my classes to have a cooperative attitude about helping one another to understand and learn. I plan activities that require you to work in collaborative groups and I expect that individuals will presentation the results of group work in front of the class to enhance our learning.

Our goal is for us to build a supportive learning climate in which we have a productive and enjoyable semester. We're in this together. We sink or swim together.

Bibliography: You may wish to reference other calculus texts to see more examples of problems worked out. Many are kept in the conference room on the top floor of Regis Hall. Do not remove the books from the conference room so that other students will have access to them. A good reference is Callahan et al, *Calculus in Context*, New York: W. H. Freeman (1993).

Helpful web sites: www.calculus.org, www.calc101.com, and <http://www.calculus-help.com>. To find others, go to google and type in calculus.

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.

Calculus I Self-evaluation

This Self-evaluation will be due on Wednesday, December 6, and will count as 5 per cent of your grade. You will be scored on the quality of your evaluation of yourself, your work in this course and your progress and understanding. 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, competence and achievement, not on effort. It usually takes a lot of effort to achieve these but effort alone, without achievement, understanding, and competence in the subject matter, does not warrant a passing grade.

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. Did I try 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 compare my work with the answer sheet until I understood where I went wrong?
- 5) IN-CLASS PARTICIPATION: 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 THE TEXT:
- 10) MISCELLANEOUS: Here say anything else you'd like to say.

MA165 – Calculus I

TEN A DAY

Fall 2006, MWF am

Assignments from *Single Variable Calculus, 4th edition* by Hughes-Hallett, Gleason, McCallum, et al.

TOPIC DATE	CHAPTER/ SECTION	PAGE	EXERCISES	ASMT. #	
<u>DUE</u> FUNCTIONS AND MODELS					
	Read the Preface, especially page x !!!				
Functions and Change 9/8	1.1	7	1,8,11,13,15,16,25,32,35,36	#1	F
Exponential Functions M9/11	1.2	14	4,6,14,16,18,21,23,31,34,37	#2	
New Functions from Old 9/13	1.3	21	4,9,15,21,27,42,43,46,50,53	#3	W
Logarithmic Functions 9/15	1.4	27	1,7,11,14,23,32,39,41,43,46	#4	F

Form groups of size 2 to do proj.#1.

Choose one of the harder even # word probs.from the book or a prob.of your own.

Trigonometric Functions 9/18	1.5	35	6,8,11,13,19,23,27,28,38,43	#5	M
Powers, Polys., and Rational Functions 9/20	1.6	42	2,5,9,11,12,14,15,19,24,31	#6	W
Introduction to Continuity 9/22	1.7	47	2,6,8,11,13,15,17,19,20,22	#7	F
Limits M9/25	1.8	55	2,3,8,12,15,16,21,27,29,34	#8	

Each Project Group to turn in a write-up of the solution to your project problem.

Chapter One Review W9/27		58	3,7,9,13,17,22,31,35,37	#9	
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Also do the EVEN true/false questions 2 – 20 under Check Your Understanding on pages 62

<u>QUIZ</u> on Chap.1, and a discussion of Section 2.1, <i>How do we Measure Speed?</i> 9/29					F
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How do we Measure Speed? 10/2	2.1	71	1,3,5,6,8,9,12,14,17,18	#10	M
The Derivative at a Point 10/4	2.2	78	1,2,9,10,13,15,17,33,37,39(Uses 33)	#11	W
The Derivative of a Function 10/6	2.3	86	7,11,13,15,20,22,35,37,38,40	#12	F

NO CLASS M 10 / 9

Interpretations of the Derivative 10/11	2.4	91	1,2,5,6,8, 9,10,12, 15, 19	#13	W
The Second Derivative 10/13	2.5	97	2,3,4,11,13,14,18,19,21,23	#14	F
Continuity and Differentiability 10/16	2.6	101	2,3,5,6,8,9,11,12,14,15	#15	M
Chapter Two Review 10/18	Pages 103 - 106	5,11,14,22,31	(Related to 22),24,26,28-30	#16	W

Also do the EVEN true/false questions 2 – 20 under Check Your Understanding on page 106 - 107.

Powers and Polynomials 10/20	3.1	116	7,10,17,27,34,36,40,55,57,65	#17	F
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Pass out TAKE-HOME MID-TERM EXAM on Chapters 1 and 2. DUE at beginning of class on Monday, Nov. 6.

The Exponential Function 10/23	3.2	120	4,13,19,23,26,28,35,38,40,42	#18	M
The Product and Quotient Rules W10/25	3.3	124	2,4,12,22,34,35,45,50,51,56	#19	
The Chain Rule F10/27	3.4	130	16,24,26,29,48,53,68,71,74,79	#20	
The Trigonometric Functions 10/30	3.5	136	5,11,18,20,25,27,37,44,45,46	#21	M
The Chain Rule and Inverse Functions 11/1	3.6	141	3,6,18,20,23,31,44,53,57,60	#22	W
Implicit Functions 11/3	3.7	145	2,9,11,14,15,16,17,19,24,33	#23	F
Linear Approxn. and the Deriv.(Skip 3.8) 11/6	3.9	154	1,2,3,4,7,9,11,20,21,25	TAKE-HOME DUE	#24 M
Thms. about Differentiable Functions 11/8	3.10	158	2,3,4,5,6,7,9,10,11,14	#25	W
Chapter 3 Review 11/10		159 -161	9,17,23,58,65,69,70,73,75,79	#26	F

Also do the EVEN true/false questions 2 – 20 under *Check Your Understanding* on page 163.

QUIZ on Chap.3, followed by discussion of Section 5.1, <i>How do we Measure Distance Traveled ?</i>				#27	
M11/13					
How do we Measure Distance Traveled ?	5.1	246	1,5,6,8,13,16,18,21,23,26	#28	W
11/15					
The Definite Integral	5.2	253	2,4,7,14,17,20,24,27,28,29	#29	F
11/17					
Project Groups of size at most 2 should choose a project from the end of Chaps. 1, 2, 3, 4, or 5; 1st come, 1st serve.					
The Fund.Thm.and Interps.of the Definite Integral	5.3	261	2,6,14,15,16,18,19,24,32,34	#30	M
11/20					
Theorems About Definite Integrals	5.4	270	2,3,6,10,11,17, 19,22,35,38	#31	W
11/22					

THANKSGIVING

BREAK

Chapter 5 Review		272 – 275	1,3,7,14,15,21,28,31,33,38	#32	M
11/27					

Also do the EVEN questions 2 – 22 under *Check Your Understanding* on page 278.

QUIZ on Chap.5, followed by discussion of Section 6.1, <i>Antiderivatives Graphically and Numerically</i>				#33	W
11/29					
Antiderivs. Graphically and Numerically	6.1	285	1,4,6,10,11,15,17,18,23,25	PROJECT DUE #34	F
12/1					
Constructing Antiderivatives Analytically	6.2	292	6,12,28,32,45,54,66,71,77,86	#35	M
12/4					
Differential Equations	6.3	297	2,4,7,9,11,12,13,14,19,23	#36	W
12/6					
Second Fundamental Theorem of Calculus	6.4	302	4,5,7,8,12,19,20,23,24,33	SELF-EVAL. DUE #37	F
12/8					
Chapter 6 Review		306 – 307	14,17,20,34,42,45,47,48,52,55	#38	M
12/11					

Also do the EVEN questions 2 – 20 under *Check Your Understanding* on page 309.

Note: Any Remaining Group Project Presentations will be done during this, our last class.