

**MATHEMATICS DEPARTMENT**  
**MATH 1520 Calculus for Management and Social Sciences**  
**Winter 2010**

	<b>A01</b>	<b>A02</b>	<b>A03</b>
<b>Section:</b>			
<b>Instructor:</b>	<i>R. Borgersen</i>	<i>R. Borgersen</i>	<i>Dr. S. Lui</i>
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<b>Office:</b>	425 Machray Hall	425 Machray Hall	536 Machray Hall
<b>Office Hours:</b>	TBA	TBA	TBA
<b>Lectures:</b>	MWF 2:30 pm – 3:20 pm T 1:00 pm – 2:15 pm 305 St. Paul’s College	MWF 11:30 am – 12:20 pm  225 St. Paul’s College	TR 11:30 am - 12:45 pm  225 St. Paul’s College
<b>Labs/Tutorials (required)</b>	<b>One of the following (Thursdays)</b>	<b>One of the following (Wednesdays)</b>	<b>One of the following (Mondays)</b>
	B01 – R, 1:00 pm, 385 University College	B04 – W, 8:30 am, 419 Machray Hall	B08 – M, 10:30 am, 419 Machray Hall
	B02 – R, 1:00 pm, 305 St. Paul’s College	B05 – W, 9:30 am, 305 St. Paul’s College	B09 – M, 12:30 pm, 124 Machray Hall
	B03 – R, 1:00 pm, TBA	B06 – W, 1:30 pm, 124 Machray Hall	B10 – M 2:30 pm, 315 Machray Hall
		B07 - W, 2:30 pm, 315 Machray Hall	B11 – M 3:30 pm, 315 Machray Hall

**WEBPAGE:** <http://www.robertborgersen.info/Math1520>

**TUTORIALS:** Each lecture section is divided into a number of tutorial sections. A tutorial section involves a smaller number of students, and is the place where you get a chance to see more examples worked and to work problems under the supervision of an instructor who knows the subject. As with the lectures, you can greatly increase the effectiveness of the tutorials by preparing for them: If you are aware of specific questions and difficulties before you go into the tutorial, you are more likely to get them solved. There will be five tests given in the tutorials approximately every two weeks. The tutorial grade will be calculated by discarding your worst mark (including absences) and averaging the rest. Make-up tests for missed tests are **not available**. Students who miss a test due to valid medical or compassionate reasons should contact their instructor.

**TUTORIALS BEGIN MONDAY, January 11, 2010.**

**MIDTERM EXAMINATION:** The midterm examination will be held on **Thursday, February 25, 2010** at **5:30 p.m. - 6:30 p.m.** Its location will be announced later. Students who miss writing the midterm exam for valid medical or compassionate reasons may be granted permission to write a deferred exam by their instructor.

**LAST DAY FOR VOLUNTARY WITHDRAWAL:** Thursday, March 19, 2010.

**MARKS:** Your final grade in this course will be determined by the marks you earn on a final exam, a mid term exam and five tutorial tests (the average of the best four of five will be used). The relative weightings of these components towards your final grade is as follows (calculators may not be used for tests and exams).

<b>FINAL EXAMINATION</b>	<b>60 PERCENT</b>
<b>MIDTERM EXAMINATION</b>	<b>30 PERCENT</b>
<b>TUTORIAL TESTS (and assignments, A01 only)</b>	<b>10 PERCENT</b>

**Section A01 is a developmental section** with an additional teaching period each week for a total of four teaching periods and one tutorial each week. This will enable us to do some review of relevant high school material as well as cover the MATH 1520 course a little more slowly. As in other sections, students in the developmental section will be required to write a final exam, a midterm exam and five tutorial tests. However, in addition, four **compulsory** problem sets will be assigned. These are to be handed in for grading. (Note that university regulations require regular attendance and completion of term work.) The assignments and tutorial test will count for 10% of the final grade with the assignments being weighted approximately 2% each and the average of the best four of five tutorial tests accounting for 2%.

## **MATERIAL TO BE COVERED**

**TEXT:** Calculus with Applications (Brief version), 9th edition by Lial, Greenwell and Ritchey, Addison Wesley, 2008 (Note: older editions are also acceptable).

A booklet of old midterm and final exams with solutions (available in the bookstore).

### **TOPICS:**

- 1.1 – 1.2 Linear functions, supply and demand functions, cost functions
- 2.1, 2.4 – 2.6 Exponential and logarithmic functions, applications.
- 3.1 – 3.5 Limits, including the use of limits to find vertical and horizontal asymptotes, continuity, rates of change, the derivative.
- 4.1 – 4.5 Calculating the derivative: polynomials, products, quotients, chain rule, exponentials, logarithms.
- 5.1 – 5.4 Increasing/decreasing functions, extrema, concavity, curve sketching.
- 6.1 – 6.2 Absolute extrema and applications.
- 7.1 Antiderivatives
- 7.3 – 7.4 Area and the definite integral, Fundamental Theorem of Calculus.
- 9.1 – 9.2 Functions of several variables, partial derivatives.

## LIVING WITH MATHEMATICS MATH 1520 - January 2010

Learning mathematics is a lot like building a house. A strong foundation is needed to produce a sturdy structure while a weak foundation will quickly expose any structural deficiencies. In much the same way you will require a good grounding in your high school mathematics if your study of Calculus 1520 is to be successful.

**DIAGNOSTIC TEST:** As a means of assessing your readiness for Calculus 1520 there is a self-administered **diagnostic test** available on WebCT (<http://www.umanitoba.ca/webct>). Do this test as soon as possible to determine whether remedial action will be required.

**You cannot learn calculus by cramming at the end of term.** It just is not that kind of subject; it involves ideas and computational methods which can't be learned without practice. By way of an analogy, how many athletes do you know of who do well in contests by training for only a few days in advance?

These notes attempt to provide some hints about how to get the most out of the teaching system used for this course (**lectures and tutorials**), and also to provide some concrete information of a more or less useful nature (**Help Centre, marks**). Before you consider particular items, there are a couple of **regulations** about lectures and tutorials that you should be aware of:

1. You must **take and also attend** one of the tutorials **associated with the lecture section in which you are registered**. Consult the Registration Guide for the times of these tutorials.
2. There will be marks associated with your tutorial work (**this is explained later**). If you change tutorial sections, it is **your responsibility** to make sure that a correct record of any marks accumulated up to the time of the change is passed on to the instructor of your new tutorial section.

**LECTURES:** During lecture periods professors present the course material to you. Because of the relatively large numbers of students in a lecture section and the necessity of presenting a certain amount of new material each day, lectures may seem rather formal. Almost certainly they will be quite different from your previous classroom experience.

No teaching system can be effective without work: Do not expect to learn calculus simply by listening to lectures (or even taking notes). Here are a couple of ways to increase the effectiveness of the lecture system. (The first is particularly important, but both are useful).

1. **Review** the lecture material as soon as possible, preferably the same day. Use the text during this review, and understand the material as completely as you can. Do as many textbook problems as you can; mathematics is a problem solving discipline. You can't learn by watching other people solve problems - you have to solve them yourself. (See comments on tutorials as well).
2. **Refer to the course outline**, and try to read through the material before it is covered in lectures. In such a process, it is not necessary to completely understand; if you have even a vague notion about what is going on from reading ahead, the lectures will be easier to follow.

**QUESTIONS:** Do not be troubled if you have questions, because everyone does. Some have less, some have more, but in any case you can bet that if you have a question, someone else probably has the same one. Because of the relatively large number of students involved and the necessity of presenting course material, general discussion in lecture periods has to be pretty strictly controlled. There is a little more time available for questions in tutorials, but even with this you may find that you can't get all your difficulties settled in the scheduled teaching periods. So here are some ways to get answers to questions.

1. **Study your textbook** (This may seem pretty obvious, but people don't always think of it).
2. **Talk** the problem out with another student. In this sort of exchange, both parties usually benefit. So, if someone asks you a question, don't brush them off because it might waste your time. If you can solve their problem, you may well learn in the process.
3. **Go to the Mathematics Help Centre.** This is located in Room 318 Machray Hall. Its purpose is to provide a place where students can get answers to specific mathematical problems related to their course. The Help Centre will open on Monday, January 19, 2009 and the hours of operation will be posted on the door of Room 318.
4. **Go** to your professor or possibly your tutorial instructor. You will find them quite willing to help.

**ONE CAUTION: DON'T EXPECT ANYONE TO RE-TEACH LARGE CHUNKS OF THE COURSE.**  
It is **your responsibility** to keep up with course material.

### **ACADEMIC DISHONESTY**

The Department of Mathematics, the Faculty of Science and the University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations or assignments as serious offenses and may assess a variety of penalties depending on the nature of the offense.

Acts of academic dishonesty include bringing unauthorized materials into a test or exam, copying from another student, plagiarism and examination personation. Students are advised to read section 7 (Academic Integrity) and section 4.2.8 (Examinations: Personations) in the "General Academic Regulations and Requirements" of the current Undergraduate Calendar. *Note, in particular that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.*

Penalties for violation include being assigned a grade of zero on a test or assignment, being assigned a grade of "F" in a course, compulsory withdrawal from a course or program, suspension from a course/program/faculty or even expulsion from the University. For specific details about the nature of penalties that may be assessed upon conviction of an act of academic dishonesty, students are referred to University Policy 1202 (*Student Discipline Bylaw*) and to the Department of Mathematics policy concerning minimum penalties for acts of academic dishonesty.

The *Student Discipline Bylaw* is printed in its entirety in the Student Guide, and is also available on-line or through the Office of the University Secretary. Minimum penalties assessed by the Department of Mathematics for acts of academic dishonesty are available on the Department of Mathematics web-page.

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report incidents of academic dishonesty to the Head of the Department.

**MATH 1520 suggested Homework Problems from Text**  
**Calculus with Applications** (9<sup>th</sup> edition) by Lial et al

A01 only	sec. R.1	p. xxvii	all odd numbers;
A01 only	sec. R.2	p. xxx	all odd numbers;
A01 only	sec. R.4	p. xxxix	#1 - 7 odds;
	sec. 1.1	p. 15	#1-35 odds, 39, 41, 63;
	sec. 1.2	p. 28	#1-39 odds;
	sec. 2.1	p. 66	#1-49 odds, 55-73 odds, 77, 79, 83 (rough sketch in (c));
A01 only	sec. R.4	p. xl	#9, 11, 13, 19, 27, 29, 35;
A01 only	sec. R.6	p. l	#1 - 23 odds, 31, 35, 45, 47;
A01 only	sec. R.7	p. liv	#1, 7, 21, 23, 25, 27, 35, 37;
	sec. 2.4	p. 106	#1-11, 13, 15, 17, 23, 31, 33, 35, 37, 39, 41, 45, 47 (a)(b);
	sec. 2.5	p. 121	#1-63 odds, 67 (a)(b), 71 (without graphing calculator), 77;
	sec. 2.6	p. 133	#1-25 odds, 27, 29, 31, 37, 39, 41;
	sec. 3.1	p. 163	#1-51 odds, 57;
	sec. 3.2	p. 175	#1-6, 7-27 odds, 33,35;
	sec. 3.3	p. 189	#1, 5, 7, 9, 15, 23, 27, 29;
	sec. 3.4	p. 210	#1, 3-10, 11-23 odds, 33-39, 49, 50, 53;
	sec. 3.5	p. 220	#3-15 odds;
	sec. 4.1	p. 248	#1-45 odds, 46, 51-55 odds;
	sec. 4.2	p. 259	#1-31 odds, 32, 36, 39, 43;
	sec. 4.3	p. 269	#1, 3, 7, 11, 23-49 odds, 53, 55, 63;
	sec. 4.4	p. 279	#1-33 odds, 37, 38, 39;
	sec. 4.5	p. 289	#1-43 odds, 55, 56, 57;
	sec. 5.1	p. 313	#1-8, 9-35 odds, 40, 41, 45;
	sec. 5.2	p. 327	#1-8, 9-33 odds, 41;
	sec. 5.3	p. 341	#1, 7, 9, 13, 17, 27-33, 37, 39, 41, 73, 93;
	sec. 5.4	p. 354	#3, 7, 13, 15, 17, 21, 25, 35-39 odds;
	sec. 6.1	p. 372	#1-9, 11, 15, 17, 21, 23, 25, 27, 33, 35;
	sec. 6.2	p. 382	#1-25 odds, 28;
	sec. 7.1	p. 438	#1-55 odds, 57, 59, 65, 67, 69;
	sec. 7.3	p. 458	#15, 16;
	sec. 7.4	p. 471	#1, 3, 5, 9, 11, 13, 15, 17, 23, 31-43 odds, 51, 52, 57, 59;
	sec. 9.1	p. 554	#1, 3;
	sec. 9.2	p. 566	#1-45 odds.