Math 170A – Calculus I
Fall 2009 – MWF 7:30-8:40am

Instructor – Dr. Trisha Moller
Office: PPHAC 223
Phone: 610-861-1335
Email: metmm01@moravian.edu
Office hours: MWF 9:00-10:00am or by appointment

Course Materials – The basic text is *Calculus, Sixth Edition*, by James Stewart. In addition, all students are expected to have a graphing calculator and bring it to class. We recommend the TI-83plus; instructions will be provided on this calculator, but students who wish to use a comparable calculator may.

Course Goals – In this course you will be learning the mathematical language of change. In particular you will learn differentiation methods and the concepts behind them, concepts of integration and how to work with functions graphically, algebraically, numerically, and verbally. You will also learn how to apply these methods to real world problems and how to discuss and present solutions to mathematical problems in written and oral form.

Exams – We will have two in class exams and a final exam. The dates for the in class exams are tentatively scheduled for Friday, October 9, and Friday, November 20. The final exam is scheduled for Friday, December 11 at 8:30AM. If you must miss an exam it is your responsibility to contact me *in advance* to make arrangements.

Proficiency Tests – In addition to the regular exams there will be two proficiency exams. When these exams are first given in class your recorded score will either be a 0% or 80-100%. If you receive a 0% then you may retake the exam as often as necessary within 4 weeks of the original exam date. When you score at least an 80% on a retake, your recorded score will be changed to an 80%. Thus the only way to receive a score of more than 80% is to do well the first time you take the test.

   The Limit Proficiency test is scheduled for Friday, September 25, and retakes may be done through October 23. The Derivative Proficiency test is scheduled for Friday, October 30, and retakes may be done through December 2.

Homework/Quizzes – Each day there will be homework assigned. Some problems will be turned in, some are just for practice. It is vital that you do all the homework problems assigned; you should keep all your work in a binder or notebook for reference. 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!

   Approximately once a week we will have a short, in-class quiz. The quiz questions will be based mostly on the assigned homework problems. The best way to do well on the quizzes is to do all the assigned homework.

Attendance – Regular attendance is vital. 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-reproved cases.

Evaluation and Grading – Grades will be computed based on the weights below:

> Culture Points – 5%
> Limit Proficiency Test – 5%
> Derivative Proficiency Test – 10%
> Quizzes/Homework – 15%
> Labs – 10% total
> 2 Exams – 15% each
> Final Exam – 25%

Learning Disability Accommodations – Students who have documented learning disabilities and wish to request accomodations for this class should contact the Learning Services Department. Accomodations cannot be provided unless official documentation is received from the appropriate campus office.

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.

Culture Points

> To those who do not know mathematics it is difficult to get across a real feeling as to the beauty, the deepest beauty, of nature …If you want to learn about nature, to appreciate nature, it is necessary to understand the language that she speaks in.
>
> *Richard Feynman*

One goal for this class is to provide some perspective of mathematics, and the role it plays in our modern world. Whether you plan to be a mathematician, a scientist, or simply a well-rounded liberal arts graduate, it is important to be aware of the role and nature of mathematics today. To help meet this goal, 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.

Basic overview of culture points

Culture points activities will account for 5% of your final course grade. **To get full credit for this activity, you must accrue 15 points by the end of the semester**. You gain points by attending seminars, colloquia or other talks; discussing mathematics outside class; reading articles; giving presentations; solving problems.

To get credit for an event, you will need to submit a short write-up for the event. This write-up will have two portions: (1) a short description of the event and (2) a reflection on the impact of that event on your own understanding of mathematics.

Points will be given based both on the quality of the event and the quality of the submission. The following sections provide details on this activity.

Culture point activities

This list below is not comprehensive – it is meant to illustrate some possible activities and to provide a calibration for how many culture points different activities might provide. Note that the actual number of culture points you get will vary depending on the quality of your particular write-up.

- Attend an ϵ-talk (3 points). These short (10 to 15 minute) talks are given weekly as part of the Math Society's regular meetings.

- Attend a Math/CS colloquium (4 points).

- Attend a colloquium or conference off-campus (5 points). There are many opportunities to attend conferences throughout the valley, such as at Lafayette or Lehigh.

- Review an article on mathematics (3 to 4 points). I have attached a listing of places to look for articles, as well how many points you might get for different articles. Also look to sources such as the *New York Times*, the *Washington Post*, or PBS for mathematics in the news.

- Discuss a mathematical topic with someone outside the class (2 to 3 points) – this could be with roommates, teammates, family members, other professors. You can discuss a mathematical topic from the course or some other mathematical topic.

- Find mathematics in popular culture (2 to 3 points) – episodes of *NUMB3RS*, movies such as *A Beautiful Mind*, or references in *The Simpsons*. Also look for mathematics in the creation of movies by Pixar, LucasFilms or Dreamworks.

- Work on a problem outside the scope of the classroom (2 to 5 points). You might solve an interesting exercise or simply work on an interesting problem without quite reaching a solution.

Rules for submission

Your culture point write-up must be neat and well-written (complete sentences, paragraph structure, etc.). I prefer your submissions to be typed, but I will accept hand-written submissions – particularly if there is a great deal of mathematical notation. For each submission, keep in mind that there are two portions:

1. **Summary of the event:** This section of the write-up should constitute no more than 50% of your submission. Summarize the talk, conversation, article, or event. If you were working on a problem, discuss *how* you approached the problem and whether you were able to arrive at a satisfactory answer (provide the actual solution or work on the problem on an attached page).

2. **Reflection on the event:** How does the event affect your understanding of mathematics and mathematicians? Do you have a greater appreciation of the role of mathematics in society or the nature of mathematical research? Does the event connect with the mathematics you've learned in this course (or any of your other mathematics courses)? If you worked on a problem, explain how your work on that problem has influenced the way you solve problems or your understanding of the mathematics involved.

Be sure to clearly state what the involved event was. If you watched an episode of a series, be sure to include the name of the episode as well as the name of the series. If you read an article, include a full citation of the article (do NOT include a copy of the article itself). If you attended a talk or seminar, include the name of the talk and of the speaker.

Miscellaneous rules

- You may make at most one culture point submission per week.

- At least one culture point submission needs to based on a talk, colloquium or seminar. At least one culture point submission needs to be based on an article or reading.

- Culture point submissions that do not follow the above rules (particularly regarding neatness and making full citations) will be penalized or rejected.

- Culture points above the required number will be used as "extra credit" – how extra culture points translate to bonus points on the final grade will be determined at the end of the semester.

Places to go for articles and other writings

Books and Journals

- (3 points) – mathematical articles from popular journals such as *Popular Science, Scientific American,* or *National Geographic*

- (3 to 4 points) – teaching-oriented journals such as *Mathematics Teacher* or *Mathematics Teaching*

- (3 to 4 points) – articles from journals such as *American Mathematical Monthly, The College Mathematics Journal, Mathematics Magazine,* or *PME Monthly.* Many of these journals can be found in JSTOR and are available both in Reeves and the the Mathematics library.

- (3 to 4 points) – many books provide terrific insight to the nature of mathematics. Pick a chapter of almost any of the general mathematics books by Martin Gardner, Ian Stewart, Sherman Stein, or Keith Devlin.

There are many other interesting articles out there – look through some of the search engines available through Reeves to discover articles on your own.

Math in the news

Look through the newspapers, especially the *New York Times,* the *Chicago Tribune* and other major newspapers for articles on mathematics in modern culture.

You can also find mathematics on the History Channel, the Discovery Channel, or PBS.

Consider almost any topic: the war in Iraq, football, jazz music, security at the airports, global warming, sinkholes, overpopulation, Windows Vista, poker. If you search through the web facilities available in Reeves, you can find an article connecting your favorite activity to mathematics.

Web Resources

Below are just a few links to mathematical articles (and a rough indication of their point value)

- `http://www.maa.org/news/columns.html` (2 to 3 points)

  There is a host of columns here – all quite readable. Be sure to look through the archives to find articles of particular interest.

- `http://www-groups.dcs.st-and.ac.uk/˜history/` (3 points)

  Look up a mathematician or mathematical topic here for a historical perspective on the mathematics you are learning. Start with those mathematicians that are mentioned in class (so who is that Simpson guy behind Simpson's rule for integration?).

- `http://www.cut-the-knot.org` (3 points)

  Lots of interesting mathematical tid-bits, most of which include an interactive applet for you to experiment with.

- `http://plus.maths.org/` (3 points)

  An on-line magazine devoted almost exclusively to questions in the mathematical sciences.

COURSE OUTLINE

Day	Date	Stewart	Assignment
M	8/31	1.1	1.1: 1, 5-9odd, 23-31odd, 41
		1.2	1.2: 1,3,5
W	9/2	1.2	
		1.3	1-5odd, 9-11all, 31, 33, 41, 43, 55
F	9/4	1.5	7,11,15,17
		1.6	1-13odd,23,25,27,35-39odd,49,59-63odd
M	9/7	NO CLASS	LABOR DAY
W	9/9	2.1/LAB 1: Slopes	1,5
F	9/11	2.2	1-9 odds,13,15,21,25-27 all (worksheet?)
		2.3	1,3,11-17odd,21-25odd,40,46
M	9/14	2.6	1-7odd,15-33odd,39-43odd
W	9/16	2.6	Lab 1 DUE
F	9/18	2.4/Lab 2	1,2,3,15-21odd worksheet
			handin: 20, 22
M	9/21	2.4	
		2.5	
W	9/23	2.5	1-11 odd,16-18all,21,23,31-37odd, 41
F	9/25	LIMIT PROF	covers 2.1-2.3, 2.6
		2.7	1,3,7,17,19,21,25,27,31,33
		2.8	1-7odd,19,21,25
M	9/28	3.1	3-33 odd, 39, 45, 47
			Lab 2 DUE
W	9/30	3.2	1-27 odd, 31, 41, 43
F	10/2	App D: Trig Review	(1,7,11,19,29, 31) (59,63,65-71 odd)
M	10/5	3.3	1-19odd,21,31,33
W	10/7	3.4	1-19 odd, 23-35 odd, 39-45odd,51,53,61,69
F	10/9	EXAM	EXAM

Day	Date	Stewart	Assignment
M	10/12	NO CLASS	FALL BREAK
W	10/14	Derivatives	Practice and applications
F	10/16	3.5	3-11 odd, 15,17, 27, 45-46, 49, (59, 61orthogonal stuff), 65
M	10/19	3.6	9-19odd,25, 34,37-41odd,51
W	10/21	3.10	5, 7, 15, 17, 21, 23 Skip??
F	10/23	Lab 3/4.8	1-7odd,11,31 Skip??? Last day for Limit Prof retakes
M	10/26	3.7 3.8	3abcg, 9, 21 Skip??? 1,3,9,17 Skip???
W	10/28	3.9	3-15 odd, 27 handin: 8, 20, 28
F	10/30	DERIV PROF 3.9	
M	11/2	4.1	1-9 odd, 15, 17, 31, 35, 47-55 odd Lab 3 DUE
W	11/4	4.2	1-5 odd, 11-17odd, 25
F	11/6	4.3	1-7 odd, 9-17 odd, 23,25,27,33
M	11/9	4.5	5-11odd,19,43 handin: 4,16, 32
W	11/11	4.4	1-21odd,37,(39,43),53-57odd,69
F	11/13	LAB 4/4.7:	Optimization
M	11/16	4.7	35,9,13,14,16,17,31,53,65 handin: 10, 30
W	11/18	4.9	1-19odd (not 17), 23-33odd, 39, 41, 57, 59
F	11/20	EXAM	EXAM
M	11/23	LAB 5:	Area and Integration Lab 4 DUE
W	11/25	NO CLASS	THANKSGIVING
F	11/27	NO CLASS	THANKSGIVING
M	11/30	5.1	3,5,17,19
W	12/2	5.2	1,17,29,33, 35, 36, 39, 41, 47, 49 Lab 5 DUE Last day for Deriv Prof retakes
F	12/4	5.3	1,3, 7, 9, 19-35odd
M	12/7	5.4 5.5	5-11 odd, 23-35 odd,59 1-11odd, 21, 29, 31, 51, 53, 59, 61
W	12/9	Review	