Math Xb Project, Spring 2006

For your project this semester, you will be learning a topic from calculus that we have not covered in class. You'll be learning one of the topics below and then teaching that topic to some of your classmates.

- Newton's method for solving an equation (Gottleib,[1] Appendix G; Stewart,[2] section 4.8)
- Finding volumes of solids of revolution (Gottleib, section 28.1; Stewart, section 6.2)
- Simpson's rule, including the error bound (Gottleib, section 26.2; Stewart, section 5.9)
- Infinite Series: Integral test (Stewart, section 8.3, although you'll need to look at 8.2 as well)
- Infinite Series: Comparison test (Stewart, section 8.3, although you'll need to look at 8.2 as well)
- Methods of integration: Integration by parts (Gottleib, section 29.1; Stewart, section 5.6)
- Methods of integration: Trigonometric substitution (Gottleib, section 29.2; Stewart, section 5.7)
- Methods of integration: Partial fractions (Gottleib, section 29.3; Stewart, section 5.7)
- Methods of integration: Improper integrals (Gottleib, section 29.4; Stewart, section 5.10)
- Applications of integration: Probability (Stewart, section 6.7)
- Differential Equations: Solving separable equations, mixing problems (Gottleib, section 31.4; Stewart, section 7.3)
- L'Hospital's rule: indeterminate forms $0\cdot\infty$,$\infty-\infty$, 0^0, ∞^0,1^∞ (Gottleib, Appendix F; Stewart, section 4.5)
- Taylor polynomials (Gottleib, section 30.1)

Picking your topic

By Wednesday, April 12th, your group should let your TF know which topic you will be learning and presenting. Those of you who will be going on to Math 1b, please note that all of the topics except for Newton's method and L'Hospital's rule are likely to be topics in 1b and we recommend that you choose a topic that will help prepare you for 1b.

Learning about your topic

Use the references given above to learn about your topic. You'll need to read about the topic and do problems. Your goal is to know the topic well enough that you can explain it to other students. Don't forget to use your TF and CA as recourses – if you find part of your topic confusing, ask someone to help you out!

Topic Summary Paper

Once you feel like you understand the topic, write up a 2-3 page paper summarizing the topic. Eventually, you'll be giving this paper out to your fellow students to help them learn this topic, so you'll want your paper to be clear and concise (think of it as being something like review guide which would help you to prepare for on exam on the topic). The paper should explain the important points of the topic and should contain at least two problems worked out step-by-step.

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[1] Gottleib = Robin Gottlieb, *Calculus: An Integrated Approach to Functions and Their Rates of Change* (our Math X textbook)

[2] Stewart = James Stewart, *Calculus: Concepts and Contexts (Single Variable)* (the textbook being used for 1a and 1b)

Give your summary paper to your TF by Friday, April 21st, at 4pm. Your TF will make comments and suggest revisions to your paper. The final version of your summary paper will be due when you give your lesson presentation.

Preparing the Lesson

You will be giving a 20-minute lesson on your topic. Twenty minutes isn't a lot of time, so you won't be able to cover the entire topic in detail – you'll need to choose what you feel are the most important points to cover.

A draft lesson plan (an outline of what you plan on doing during the lesson) is due to your TF by Tuesday, May 9th at Noon. Your TF will have revisions available for a group member to pick up by Thursday, May 11th at Noon. You will then have a chance to revise your lesson plan before you give the lesson. The final version of your lesson plan is due when you give your lesson presentation.

Lesson Abstract/Advertisement

Each group will need to submit a 2-4-sentence abstract of your lesson. This abstract is due by May 9th at Noon (the same time as your draft lesson plan). This will serve as the advertisement for your talk and will help the other Math Xb students decide which lessons they will be attending. Note that we will be giving extra credit to the three presentations with the highest attendance.

Lesson Presentations

The lesson presentations will be held May 15th and 16th between 1pm and 3:30pm. At your lesson presentation, your group should be ready to hand in your revised lesson plan. You should also have 11 copies of your summary paper – one for the TF and 10 copies to hand out to students. Each group member should also hand in an evaluation of the performance of the other group members – this evaluation will be part of group member's grade.

Please note that you can go as low-tech or high-tech in presentations as you want. The presentations will be in rooms equipped with overheads, hookups for computer projection, and, of course, blackboards. Also note that we will be giving extra credit to the three presentations with the highest attendance.

Attending Lesson Presentations

You are required to attend at least two lessons on topics other than your own and to turn in evaluation forms about those lessons. Your attendance grade will be based in part on your thoughtful evaluation of the presentations.

Project Grades

The grades for the project will be calculated as follows

4%	Draft of 2-3 page project summary paper
4%	Draft of lesson presentation
2%	Lesson abstract/advertisement
20%	Final project summary paper
15%	Final lesson plan
30%	Evaluation of lesson presentation by TF
5%	Peer evaluation of lesson presentation
10%	Evaluation of your work by members of your group
10%	Attendance at and evaluation of two lessons