

Math 252 - Integral Calculus

Chemeketa Community College
CRN 30326 / Fall Term 2006 / 5 credit hours
12:30 - 1:20pm M-F in Building 7 Room 105

Instructor Information

Name: Nolan Mitchell

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Phone: 503-365-4667

Office Hours: M-F 9:30am - 10:20am

Web: <http://math.nolanmitchell.com>

Other hours may be available by appointment...don't be shy about asking!

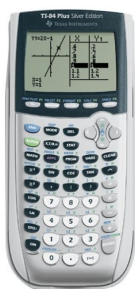
Philosophy and Style: Mathematics is one of the most engaging subjects you can study. It demands not only great concentration and precision but also an eye for creativity and innovation. You must think of your self as an artisan, or craftsman, who is learning the trade. First you become familiar with a basic set of tools--how and when to use them. Then we add new tools to your toolbox and spend time exploring their uses. The key is to gain a level of familiarity and comfort with your tools which will allow you to approach, frame, and solve new problems with confidence and skill.

We will mix group work and investigations with the traditional lecture. You are encouraged to interrupt me during lectures to ask questions and give comments. All lectures are prepared ahead of time but I do like to improvise and create new problems on the spot--often with a focus on real world applications. I try to stimulate creative thought with provocative questions and will challenge you to defend your position with evidence and logic. I incorporate technology wherever appropriate but emphasize that it is just one of the many tools in your toolbox. Lastly, I do not consider memorization to be the most important part of math courses; all tests are open notes.

Course Information

Prerequisite: A grade of C or better in Math 251 or equivalent, or instructor approval.

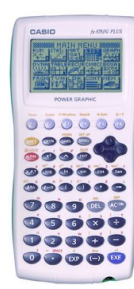
Calculators: A graphing calculator is required for this course. I would recommend either a Texas Instruments **TI-84 Plus** (about \$110) or a **TI-89 Titanium** (about \$150). The TI-84 Plus is easier to use but the TI-89 Titanium is more powerful and would be useful in calculus.



TI-84 Plus



TI-89 Titanium



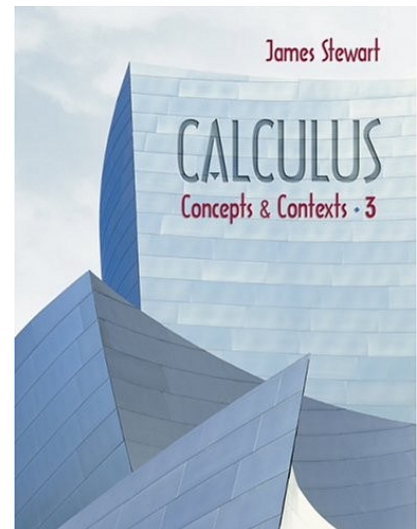
Casio FX9750G PLUS

If money is an issue, the Casio FX9750G PLUS is a bargain at \$50, but I'm probably the only instructor here who can help you with it. It's features are comparable to the TI-84 Plus. Another option would be the TI-83 or the TI-83 Plus. These are nearly identical to the TI-84 Plus.

Text: *CALCULUS: Concepts and Contexts, Third Edition*, by James Stewart, Thompson Learning, Inc., 2005, ISBN#0-534-409865 (for 251-255), or #0-534-41022-7 (for 251-253). List price: \$156.95 or \$123.95, respectively.

The text can be purchased at Chemeketa's bookstore or through online bookstores like Amazon and Half.com.

I mention these sites only as a reference--please note that neither I nor the college have any connection to them and cannot guarantee you a safe and trouble-free transaction. Also be aware that it may take 1-2 weeks for your book to arrive unless you pay for expedited shipping and that you are responsible for the material whether you have a book or not.



Course Description: This course includes the study of the construction of functions from their rates of change, integration techniques, applications of integration and an introduction to differential equations. Students are encouraged to discuss and investigate mathematics collaboratively.

Course Outcomes: Upon successful completion of this course students should be able to:

1. Create mathematical models of abstract and real world situations using antiderivative functions.
2. Use inductive reasoning to develop mathematical conjectures involving antiderivative function models. Use deductive reasoning to verify and apply mathematical arguments involving these models.
3. Use mathematical problem solving techniques involving integrals and antiderivative functions, including the use of graphical, symbolic, narrative and tabular representations.
4. Make mathematical connections and solve problems from other disciplines involving integrals and antiderivative functions.
5. Use oral and written skills to individually and collaboratively communicate about integrals and antiderivative function models.
6. Use appropriate technology to enhance mathematical thinking and understanding, to solve mathematical problems involving integrals and antiderivative functions, and judge the reasonableness of results.
7. Do projects that encourage independent, nontrivial exploration of antiderivative function applications and models.

Important Dates:

Friday, September 29	Last Day to register without instructor's signature
Friday, October 6	Last Day to withdraw/return books for a refund & last day to add a class
Friday, October 20	Audit requests and Summer Graduation applications due
Friday, November 10	NO CLASS - College closed for Veterans' Day.
Friday, November 17	Last day to withdraw w/o responsibility for grades
Thursday, November 23	NO CLASS - Thanksgiving
Friday, November 24	NO CLASS - Thanksgiving
Wednesday, Dec. 6	Final Exam from 2:00pm - 4:00pm in our regular classroom
Monday, Dec. 11	Grades posted in computer by 10:00 am
Monday, January 8	Winter Term begins

Classroom & Grading Policies

Expectations:

1. Assume personal responsibility for the success of your education.
2. Academic honesty.
3. Respect for others and contribute to a safe, cooperative learning environment.
4. Daily attendance and active participation.
5. 2 to 3 hours of personal study per day.
6. Ask questions as soon as you have them.
7. **Have fun!**

Collaborative Learning: You are encouraged to discuss and investigate mathematics collaboratively. All course work may be done with other students except for exams.

Homework: Homework is where you really learn math. I have provided a list of the **minimum** suggested homework problems for each section. Please work the suggested problems **before** the next class. Additionally, ten Problem Sets will be posted on-line every Monday and will be due at the start of class the following Friday. **Late work will not be accepted.** Each problem set is worth 20 points and your lowest two scores will be counted as extra credit. As a bonus, your homework will be considered "notes" and can be used on exams. 160 points total.

Participation: On Wednesdays we will depart from the traditional class format and have a group exploration. These are designed to expand your mathematical intuition and explore some practical applications of what we are learning. The nine explorations are worth 10 points each. 90 points total.

Exams: We will have two exams, each worth 100 points and a 170 point cumulative final exam. The final will be held on Wednesday, December 6 from 2:00pm - 4:00pm. You are free to use your notes on all exams. **No makeup exams will be offered.** You must arrange your personal and work schedules to allow you to take the exams at the scheduled times. If you feel that an exception should be made to this policy, you must see me in person **PRIOR** to the event. Each situation will be considered on a case-by-case basis.

Gateway Exam: The Gateway Exam, which is worth 100 points, measures your grasp of basic integration skills. It will have 10 problems and you must get 9 or more correct to pass. You will have two opportunities to take it in class and can retake it out of class as many times as necessary.

Presentation: At the start of Week 5 the class will be split into small groups. Each group will choose a problem to present to the class during week 10. Each member of the group will be required to submit a formal, typed report of their experience as part of their final exam. The presentation is worth 40 points and the report is an additional 40 points.

Absences: It is expected that you attend each class. If you must miss a class please let me know beforehand. Excessive absences may result in a failing grade.

Grades: Coursework will be graded on correctness, clarity of thought, and thoroughness. Partial credit is frequently given when one of the three components is missing. Your final letter grade will be determined by the percentage of possible points earned using the following scale

A 90%-100%
B 80% - 89%
C 70% - 79%

D 60% - 69%
F 30% - 59%
N <30%

There is a total of 800 points possible:

8 problem sets @ 20 points each	160 points
9 explorations @ 10 points each	90 points
3 exams (including gateway) @ 100 points each	300 points
Presentaion	40 points
Paper	40 points
Final exam	170 points

Incomplete: Incompletes are not encouraged and not automatically granted. To receive an incomplete I must agree to it and you must have completed all work to date satisfactorily (with a grade of C or better) and have only to take the Final Exam. You must also discuss your situation with me prior to the date of the final exam. Incompletes are not given in lieu of an F.

Extra Credit: Your two lowest Problem Set scores will be counted as extra credit.

Feedback: You can expect to have each assignment returned to you with written comments by the next class meeting. I will also address general areas of concern for the class as a whole during lectures.

Special Note: As with all courses, please keep a copy of all assignments in case of a computer crash or a bookkeeping error on my part. Individual grade summaries will be provided periodically throughout the term.

Outside Resources

Tutoring: There are tutors available for drop-in help in the Tutoring Center (on the second floor of Building 2—look for the big glass wall). This service is provided at no additional cost to you. I encourage you to take advantage of it.

Open Computer Labs: There are several different computer labs available for your use. The main lab is located in Room 218 of Building 6. You will need your student ID card.

E-mail: Every student at Chemeketa has a lifetime email account provided by the College (see my.chemeketa.edu). I will periodically send notes, links, and announcements to your Campus email address. This is the only email address I have access to and the only one I will send email to (I will **not** send email to any personal email account). Please check it frequently or set it up to forward messages to the email address you are using.

Websites: There are several online resources. One of the best is www.purplemath.com. Nearly all of the material presented in Mth060-Mth111 can be found on this site. You can find other resources and links on my website math.nolanmitchell.com (there is NO **www.**).

College-wide Policies

Academic Honesty: Chemeketa Community College expects that you will not submit other student's work as your own, use unauthorized notes in exams, discuss exam questions with students who have already taken an exam, or share exam information with those who have yet to take an exam. Cases of dishonesty will be reported to the Dean of Student Development, and will result in failure on the assignment, possible failure in the class, and possible expulsion from Chemeketa. Cheating will not be tolerated.

ADA: If you feel you may need an academic adjustment for any type of disability, please see me during my office hours or contact Services for Students with Disabilities at 503-399-5192.

Diversity Values Statement: We are a college community enriched by the diversity of our students and staff. Each individual and group has the potential to contribute in our learning environment. Each has dignity. To diminish the dignity of one is to diminish the dignity of us all.

Chemeketa Creed:

1. Preamble. Chemeketa Community College provides an environment that celebrates the freedom to learn and the freedom to teach. In that celebration of teaching and learning it is appropriate that individuals and groups be viewed with regard to their potential to contribute within the learning environment. Each has dignity and value.

2. Code of Behavior. As a community of people seeking education, Chemeketa students are dedicated to improving personally and academically. Choosing to join the college community obligates each member to a code of behavior.

Chemeketa students will:

- 2.1. Practice personal and educational integrity.
- 2.2. Maintain standards of academic performance and contribute to the safe, cooperative and respectful learning environment throughout the college.
- 2.3. Discourage bigotry and respect the diversity and dignity of all persons.
- 2.4. Respect the rights and properties of all persons.
- 2.5. Bear the ultimate responsibility for the effects of their decisions and behavior.

3. Student Rights. Each student in the college community has certain rights that accompany his/her responsibilities. Those rights are to be protected by both students and staff regardless of an individual's race, sex, religion, color, creed, disability, sexual preference, political affiliation, national origin, ancestry or age. The college will:

- 3.1. Provide access to education and campus facilities.
- 3.2. Assure the protection of confidential student records and information.
- 3.3. Provide opportunities for association and preserve freedom of expression

Tentative Schedule for Math 252 (12:30pm)

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	Sep 25 Introduction & Algebra Review	Sep 26 Differential Calculus Review	Sep 27 <i>Exploration #1</i>	Sep 28 5.1 Areas and Distances 1, 2, 13, 15, 20	Sep 29 5.2 The Definite Integral 1, 6, 7, 17, 20, 23, 32, 34 Problem Set 1 Due
Week 2	Oct 02 5.3 Evaluating Definite Integrals 4, 14, 23, 45, 47, 48, 50	Oct 03 5.4 The Fundamental Theorem of Calculus 3, 4, 9, 12, 15, 18	Oct 04 <i>Exploration #2</i>	Oct 05 5.4 The Fundamental Theorem of Calculus 19, 24, 26, 27, 29	Oct 06 5.5 The Substitution Rule 4, 5, 14, 16, 18, 21 Problem Set 2 Due
Week 3	Oct 09 5.5 The Substitution Rule 30, 37, 47, 50, 53, 54	Oct 10 5.6 Integration by Parts 1, 3, 5, 7, 10, 11, 12, 15, 17, 19	Oct 11 <i>Exploration #3</i>	Oct 12 5.6 Integration by Parts 2, 4, 9, 14, 18, 21 23, 25, 34, 37, 41	Oct 13 REVIEW Problem Set 3 Due
Week 4	Oct 16 EXAM #1	Oct 17 5.7 Additional Techniques & Trig. Substitution 2, 6, 10, 14, 20, 27	Oct 18 <i>Exploration #4</i>	Oct 19 5.9 Approximate Integration 1, 7, 13, 18, 20, 27 (use midpoint rule on 27)	Oct 20 5.10 Improper Integrals 1, 3, 8, 14, 17, 25 Problem Set 4 Due
Week 5	Oct 23 5.10 Improper Integrals 29, 40, 44, 47, 53 (assign project topics)	Oct 24 6.1 More about Areas 1, 3, 8, 14, 21, 22	Oct 25 <i>Exploration #5</i> Gateway Exam #1	Oct 26 6.2 Volumes 2, 7, 11, 21, 22, 23, 24	Oct 27 6.2 Volumes 27, 29, 32, 39, 42, 49 Problem Set 5 Due
Week 6	Oct 30 6.3 Arc Length 6.3: 1, 6, 9, 19, 23	Oct 31 6.4 Average Value of a Function 6.4: 1, 8, 11, 13, 15	Nov 01 <i>Exploration #6</i> Gateway Exam #2	Nov 02 6.5 Applications to Physics and Engineering 2, 3, 6, 11, 16, 19, 21, 23	Nov 03 6.6 Applications to Economics and Biology 2, 5, 8, 12, 13, 16 Problem Set 6 Due
Week 7	Nov 06 6.7 Probability 1, 4, 5, 6, 9, 11, 12	Nov 07 REVIEW	Nov 08 <i>Exploration #7</i>	Nov 09 EXAM #2 Problem Set 7 Due	Nov 10 NO CLASS Veterans' Day
Week 8	Nov 13 7.1 Modeling with Differential Equations 2, 5, 6, 8, 11, 14 (rough draft due)	Nov 14 7.2 Direction Fields and Euler's Method 2, 5, 7, 12, 18	Nov 15 <i>Exploration #8</i>	Nov 16 7.3 Separable Equations 1, 9, 18, 22, 28, 35	Nov 17 7.4 Exponential Growth and Decay 1, 4, 6, 8, 11, 13 Problem Set 8 Due
Week 9	Nov 20 7.5 The Logistic Equation 1, 5, 6, 11	Nov 21 7.6 Predator – Prey Systems 1, 4, 6, 8, 9	Nov 22 <i>Exploration #9</i> Problem Set 9 Due	Nov 23 NO CLASS Thanksgiving	Nov 24 NO CLASS Thanksgiving
Week 10	Nov 27 Student Presentations	Nov 28 Student Presentations	Nov 29 Student Presentations	Nov 30 REVIEW	Dec 01 REVIEW Problem Set 10 Due
Finals Week	Dec 04	Dec 05	Dec 06 FINAL EXAM 2:00pm – 4:00pm	Dec 07	Dec 08