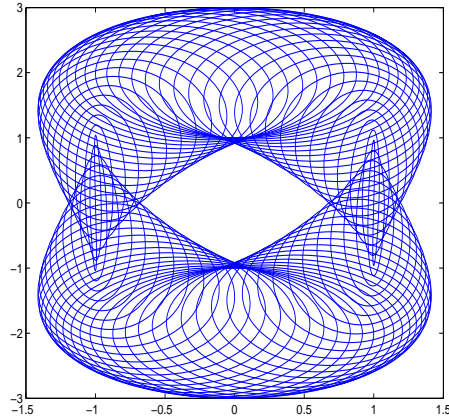


Student Handbook for MATH 263 A and B



"If I am anything, I have made myself so by hard work." - Sir Isaac Newton

Department of Mathematics Ohio University March 2008

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1 General Information

Welcome to MATH 263 Calculus at Ohio University! We hope that taking calculus in our department is a rewarding experience. Let's begin with some basics:

In Class:

Your instructor will be either a faculty member (professor) or a teaching assistant (TA). You can expect much of class time to be devoted to lectures but many instructors also employ in-class group work and other teaching techniques.

Outside of Class:

On Page 6 is a list of assigned homework problems. More than likely these will not be turned in or graded, but it is up to you to do them. Your instructor will also give you assignments using MATLAB.

Exams:

The usual exam format is two midterms and a final, although some instructors use other formats of exams and/or quizzes. There will be a common final exam that is based on the assigned homework. The best way to prepare for the final is to do and understand all the homework. There is a sample final exam at the course web site. No calculators of any kind will be allowed on the final.

Grade Policy:

Grading systems are determined by individual instructors. You must earn a grade of at least C to take the next class in the sequence.

Office Hours:

Your instructor will have office hours which are meant to be used by you to get help. Office hours are free tutoring by the best tutor for the class. Do not miss out on this resource.

Students with Disabilities:

The University and its faculty are committed to helping meet your individual needs and to supporting your efforts for a quality education. In particular, if you have a documented disability that requires an accommodation, please notify your instructor. For more information about disability services you may contact the Office of Institutional Equity 593-9140.

Academic Integrity:

Academic integrity and honesty are basic values of Ohio University. Academic misconduct is a violation of the Ohio University Student Code of Conduct subject to a maximum sanction of disciplinary suspension or expulsion as well as a grade penalty in the course (up to and including failure of the course). Incidents of academic misconduct will be handled according to established University policy. See the Student Handbook for details.

Math Department Contact Information:

Calculus 263 Coordinator: Todd Young, math263coord@math.ohiou.edu, 593-1285

Math Department Office: Morton 321, mathematics@ohiou.edu, 593-1254

Course Web Site: www.math.ohiou.edu/courses/math263

O.U. MATLAB Page: www.math.ohiou.edu/courses/matlab

2 Some Advice Before You Start MATH 263 A or B

We hope to do everything possible to help you succeed in MATH 263 at Ohio University. Before you begin, you should be aware that there are some major differences between math in high school and college: (1) We present the material more quickly than in high school; (2) We study topics in more depth than in high school; (3) Your classmates are better than in high school; (4) You have much more responsibility for your own learning than in high school.

Your instructor is responsible for teaching well. You are responsible for learning well. These responsibilities are very different. Your instructor should do everything, within reason, to help you learn, but most learning occurs outside class and requires work on your part. You should *schedule 2 hours for work outside of class* for every hour in class.

You need to keep in mind that *math is cumulative*. You need to review material from high school. You need to review material from previous classes. You need to review material from previous tests. Keep a precalculus book handy when you study calculus. Many students who perform badly in calculus do so because they have forgotten algebra and trigonometry. You should *always work, understand and review all the homework*. Math is mostly learned by doing, not by having it explained.

It is best to study by yourself *and* with classmates. A combination of individual and group study is more effective than either alone.

Go to classmates and/or your instructor about things you don't understand. You will usually find that both are very helpful, but only if you ask.

Keep note cards of all the formulas you should have memorized. Be sure to go into tests knowing all the formulas you are supposed to know. Have your roommate or study partners quiz you on the formulas.

Study the mistakes you made on previous tests. Never repeat a mistake.

Here is a good study plan:

1. Skim the book before class.
2. Go to class.
3. Do the homework and read the book.
4. Ask questions.
5. Study.
6. Take test.
7. Review test.

3 Material to know before starting MATH 263 A or B

Because *math is cumulative*, mastery and review of previous material is essential for your success. Your MATH 263A and 263B instructors will take for granted that you have mastery of the material below. You should always review it before tests. As a general rule you should understand and be able to use all the material in reference pages 1 - 4 in the inside front and back covers of the textbook. You should memorize most of the formulas on those pages.

Algebra:

How to factor a polynomial.

How to solve a system of linear equations.

How to complete the square.

Understand, *memorize* and be able to use all formulas on reference page 1, except the general binomial formula.

Caution: $\sqrt{a^2 + b^2} \neq a + b$, $\frac{a + b}{c + d} \neq \frac{a}{c} + \frac{b}{d}$.

Geometry:

Understand, *memorize* and be able to use all formulas on Reference Page 1 in the text.

Trigonometry:

Understand and be able to use all formulas on Reference Page 2 in the front of the textbook.

Memorize all the formulas, except Addition/Subtraction and Double-Angle.

Functions and Graphs:

Review sections 1.1,2 and know all functions and graphs on reference pages 3 and 4.

Memorize the graphs of $\sin x$, $\cos x$ and $\tan x$.

Graph of an Equation vs. Graph of a Function

Translation Principles: $x \mapsto (x - h)$ shifts right by h . $y \mapsto (y - k)$ shifts up by k .

Standard form of conic sections and how to get them:

Ellipse: $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$,

Hyperbola: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$,

Parabola: $4py = x^2$

If you are starting 263B: Know all the above and ...

Know Reference Page 5 differentiation rules: 1 - 8, 9, 11, 13 - 15, 17, 19 - 21, 25 - 27.

Continuity at a means: $\lim_{x \rightarrow a} f(x) = f(a)$.

All elementary functions: polynomial, rational, root, trig., exponential and logarithmic functions are continuous wherever defined.

Definition of derivative: $f'(x) \equiv \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$.

4 CD and Online Study Aids

The inside front cover of your textbook (at least if it is new) should contain 2 CD-ROMs. One of them, “Interactive Video Skillbuilder CD” has tutorials and quizzes that go with each section. We recommend that you at least try the quiz after doing the homework in each section and use the tutorial if you are having trouble with the section.

If you do not have the CD-ROM that came with your book, webquizzes can be found at www.stewartcalculus.com. Go to the site and click on the picture of our textbook. Once inside, click on the CHAPTERS tab. Select the appropriate chapter from the drop-down box; immediately below the drop-down box you will find the Web Quiz/Tutorial Quiz link. Click on it, then choose the appropriate section. Note that you may have to allow pop-ups for the quiz to appear (usually this can be done by holding down the CTRL key when clicking on the quiz link.) Accessing the video tutorials online requires you to create an account at www.ilrn.com. Detailed instructions on doing this can be found on the course website www.math.ohiou.edu/courses/math263/.

The Mathematics Department also provides a free interactive tutor program and tutorials designed to accompany many of the topics in the courses. These can be downloaded at: www.math.ohiou.edu/~just/calctutor/. Instructions on using the tutorials are included on the web site.

5 MATLAB Assignments

Your instructor will give homework assignments involving the program MATLAB. Before you begin, please read the information below. If you are an engineering student, the Russ College expects you to learn MATLAB as soon as possible and you can expect to use it throughout your career.

Where to find assignments:

The O.U. MATLAB web page is at: www.math.ohiou.edu/~matlab. It contains assignments, reference materials and sample solutions to actual assignments.

Where to find MATLAB at Ohio University:

MATLAB itself is a program that is installed on most computers on campus.

- **Computer Services Center** (ground floor) and **Alden** (2nd floor):
M - R 8am - midnight; F 8am - 10pm; Sat 10am - 10pm; Sun 12pm - 12am.
- **Boyd Hall 015, Brough House 006, Brown Hall 000, and Jefferson Hall 130**:
M - R 3pm - 11pm; F 3pm - 5pm; Sat. closed; Sun. 12pm - 11pm.
- **Morton 314**: Check lab door for available hours.
- **Morton 422**: Check lab door for available hours.

In Morton use the user name **student** and leave the password blank. In order to use the printers in Morton one must get an account from the Math Office for \$5.

- **Stocker 264, 267**: M - R 8am - 3am; F 8am - 11pm; Sat. - Sun. 12pm - 12am.
- **Stocker 127, 305, 308, 414**: M - F 8am - 11pm; Sat. - Sun. 12pm - 12am.

To log on to Stoker NT machines, you must have a username and password. For non-EECS majors, enter username **student** and leave password blank.

Getting Started:

- Always work with a partner.
- Download “A brief introduction to MATLAB”, one of the sample solutions, and your assignment from the O.U. Matlab web page.
- Go to one of the labs listed above or follow the instructions above about accessing MATLAB in your dorm room.
- Open the program MATLAB by finding and clicking the MATLAB icon on the Desktop or in the Applications menu. After you click on the MATLAB icon a “Command Window” should appear; this is where commands are entered.
- Try the commands listed in: “A Very Brief Intro to MATLAB”.
- Read a “Sample Solution” to see what is expected.
- Follow the instructions on your assignment *exactly*.
- Take notes about what happens.
- Write a brief report, answering all the questions on the assignment. Pay attention to the comments at the bottom of the assignment (they are often hints).
- One of the main goals of the assignments is to teach you to think as you compute. Keep this in mind while doing the assignments.

6 Syllabus for 263A

- | | |
|---------------------------------------|--|
| 1.3 – The Limit of a Function | 3.2 – Inverse Functions and Logarithms |
| 1.4 – Calculating Limits | 3.3 – Derivatives of Log. & Exp. Funcs. |
| 1.5 – Continuity | 3.4 – Exponential Growth and Decay* |
| 1.6 – Limits involving ∞ | 3.5 – Inverse Trigonometric Functions |
| 2.1 – Derivatives and Rates of Change | 3.6 – Hyperbolic Functions* |
| 2.2 – The Derivative as a Function | 3.7 – Indeter. Forms & L'Hopital's Rule |
| 2.3 – Basic Differentiation Formulas | 4.1 – Maximum and Minimum Values |
| 2.4 – The Product and Quotient Rules | 4.2 – The Mean Value Theorem |
| 2.5 – The Chain Rule | 4.3 – Derivatives and the Shape of a Graph |
| 2.6 – Implicit Differentiation | 4.4 – Curve Sketching |
| 2.7 – Related Rates | 4.5 – Optimization Problems |
| 2.8 – Linear Approx. & Differentials | |

*optional

7 Assigned Problems for MATH 263A

Section	Problems
1.3	2, 3, 5, 8, 12, 21; ML1 Plotting Functions
1.4	2, 3, 10, 12, 15, 17-23, 28, 32, 43, 45; ML2 Solving Equations
1.5	3, 4, 6, 13-16, 29, 30, 32, 37
1.6	1-6, 13-31 odd, 41, 42;
2.1	1, 4, 5-11 odd, 15-18, 23, 25, 27, 43; ML3 Limits and derivatives
2.2	1-13 odd, 17-22, 35, 36
2.3	1-33 odd, 36, 43, 45, 47, 49, 51; ML4 Derivatives
2.4	3-29 odd, 42, 44, 51, 55
2.5	1-35 odd, 39, 47, 51, 53, 57, 62;
2.6	1, 3, 5, 9, 11, 15, 17, 21, 25, 32
2.7	1, 2, 5, 7, 11, 15, 17, 25, 29
2.8	1, 5, 11, 12, 15, 17, 19, 20, 21, 23, 24
3.2	1-25 odd, 18, 29-39 odd, 44, 46, 48, 63
3.3	1-21 odd, 25-49 odd, 65; ML5 Exponentials
3.4*	1, 3, 4, 5, 7, 9, 13, 15;
3.5	1-9 odd, 13, 17-25 odd, 34, 35, 37, 39
3.6*	1-6, 19, 27, 29, 33, 35, 43-47;
3.7	1-33 odd, 39, 40, 41
4.1	1-17 odd, 21-29, 36, 37, 40, 44, 47, 48, 51
4.2	1-17 odd, 23, 26, 27
4.3	1-9 odd, 13, 15, 19-29 odd, 35, 40,46
4.4	5-11 odd, 12-14, 17, 21, 37, 39, 43
4.5	3, 5, 7, 9, 13, 15-17, 21, 22, 25, 26, 40

* Optional, will not be covered on the common final, but instructors may assign some problems.

8 Syllabus for 263B

4.7 – Antiderivatives	6.5 – Approximate Integration
5.1 – Areas and Distances	6.6 – Improper integrals
5.2 – The Definite Integral	7.1 – Areas between curves
5.3 – Evaluating Definite integrals	7.2 – Volumes
5.4 – Fundamental Theorem of Calculus	7.5 – Applications: Physics & Engineering*
5.5 – The Substitution Rule	7.6 – Differential Equations*
6.1 – Integration by Parts	9.1 – Curves Defined by Parametric Eqs.
6.2 – Trigonometric Integrals**	9.2 – Calculus with Parametric Curves
6.3 – Partial Fractions	9.3 – Polar Coordinates

* Optional, but it is recommended that instructors select parts of these sections.

** Integrating $\sin^2 x$ and $\cos^2 x$ will be used later, the rest is optional.

9 Assigned Problems for MATH 263B

Section	Problems
4.7	1-29 every 4th problem, 31-37 odd, 41, 44; ML 1 Anti-derivatives
5.1	1-13 odd, 14
5.2	1-11 odd, 19-21, 23, 29, 30, 31, 33, 35, 38-40; ML2 Riemann Sums
5.3	1-29 odd, 37, 41-42, 47, 49, 52
5.4	1-11 odd, 15, 17, 19
5.5	1-21 odd, 22, 23, 27, 29, 30, 34, 37, 41, 43, 49, 50
6.1	1-29 odd, 39
6.2*	1-27 odd
6.3	1-11 odd, 15-31 odd, 39
6.5	1-17 odd, 25, 27, 29; ML 3 Monte Carlo Int.
6.6	1,2, 5-33 odd, 41; ML 4 Improper Integrals
7.1	1-15 odd, 21, 24
7.2	1-15 odd, 21-27 odd, 26, 28, ML 5 Hyperbolic Functions
7.5*	1, 5, 21, 33, 35, 39, 43
7.6*	1-15 odd, 35, 39, 43, 45
9.1	1-21 odd, 22, 27
9.2	1-15 odd, 21, 27, 29, 30, 33-39, 41-47 odd
9.3	1-9 odd, 13-19 odd, 23-39 odd, 47, 49, 51; ML 6 Polar Coordinates

* Optional, will not be covered on the common final, but instructors may assign some problems.