Mathematics 111
Fall, 1998

Textbook: Larson, Hostetler and Edwards, <u>Calculus of a Single Variable: Early Transcendental Functions</u>, D. C. Heath and Company, 1995

Instructor: William P. McKibben
Office: Seney 303
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Office Hours: Mondays and Wednesdays: 1:30 - 3:30 p.m.
Tuesdays and Thursdays: 3:00 - 5:00 p.m.
Others by appointment

Course Content: Math 111 is the first semester of introductory calculus. Course content includes limits; continuity; the derivative; differentiation of algebraic, trigonometric, and the natural logarithmic and exponential functions; applications of derivatives; antiderivatives; the definite integral; simple integration by substitution; and applications of the definite integral. A list of specific topics by day is given below.

Goals: By the completion of this course, the student should have a basic understanding of the following: (1) limits and their relationship to the graph of a function; (2) the derivative and its relationship to the graph of a function and to the concept of "rate of change;" (3) the definite integral and its relationship to summation, area and volume; (4) antiderivatives and their relationship to derivatives and to the definite integral. The student should be able to find derivatives and antiderivatives and to evaluate limits and definite integrals of a large number of functions widely used in applications.

Class Attendance: The student is responsible for the course material discussed in class; therefore the student is expected to attend all classes. An inordinate number of absences will be handled in accordance with the College's policies. Note especially that you should make every effort to attend class on days that quizzes are given out (please see "Quizzes" below).

Homework: Homework assignments are for the student's benefit and will not be collected. It is important, however, that the student complete thoughtfully most of the problems assigned. The student will need to spend at least <u>6 good hours</u> of study each week, not counting time spent taking quizzes, reviewing for tests, and preparing the graphing portfolio. The student is urged to study the examples worked out in the textbook, especially those which your instructor identifies as important.

Calculators: Calculators which do <u>not</u> perform algebraic operations, differentiation or integration may be used on quizzes and tests as long as responses are in <u>exact </u>(e.g., π rather than approximate form 3.1416). In general, calculators will <u>not</u> be *needed* on tests.

Quizzes: All quizzes are announced (Please see "Course Calendar" below.) and "take home." A student must be present in class to receive a quiz. Quizzes must be done during <u>one sitting</u> and use only <u>authorized materials</u> (pencil, paper, calculator as specified above, and any reference material specifically authorized for a given quiz). Quizzes are due at class time on the class day following their assignment. If you are not in class when a quiz is given out, you generally cannot receive a copy of the quiz; however, exceptions to this policy are sometimes permitted by the professor, and you should speak with the professor as soon as possible if your absence on such a day is or was unavoidable.

Each quiz will be graded on a basis of 25 points. Twelve quizzes will be used in the determination of the student's grade, as follows: the best <u>three</u> scores on Quizzes 1-4 + the best <u>three</u> scores on Quizzes 5-8 + the best <u>four</u> scores on Quizzes 9-13 + the scores on Quizzes 14 and 15.

Major Tests: Three tests will be given as follows:

      Test 1: Thursday, September 24 at 7:45 a.m.
      Test 2: Thursday, October 20 at 7:45 a.m.
      Test 3: Tuesday, November 17 at 7:45 a.m.

Students are expected to take tests at the scheduled times. Conflicts, problems and emergencies will be handled on an individual basis. For reasons deemed legitimate by your professor, arrangements may be made for a student to take at test prior to the testing time.

Graphing Portfolio: You are to use software (GRAPHMATICA) available in the computer labs to prepare a portfolio of computer-generated graphs. The portfolio is to contain at least 15 distinctly different graphs. The function involved in each graph is to be clearly identified by formula. Use only algebraic, trigonometric (including inverse trigonometric), logarithmic and exponential functions or combinations of them. You must clearly label all important features of the graphs.

Student workers in the computer lab may help with the use of the computer and software, but you must choose your own functions and create your own printouts and portfolio. Evaluation of your portfolio will be made on the your selection of graphs, the documentation associated with the graphs and your overall presentation of the portfolio. Accuracy, clarity, organization and originality are important in your finished product. This assignment is due on <u>Friday, November 6 at class time</u>

Grading: The student's final course grade will be determined as follows:

      Major tests (3 @ 100 points)   300 points
      Quizzes (12 out of 15, as noted above)   300 points
      Graphing Portfolio   175 points
      Final Exam   <u>225 points</u>
                             1000 points

In general, letter grades will be determined as follows:

      A: 900 or more points
      B: 800-899 points
      C: 700-799 points
      D: 600-699 points
      F: fewer than 600 points

Grades of A-, B+, B-, C+, C-, D+ may be assigned for sums of points near the above cut-offs in total points.

Scheduled Help Outside Class: Keith Burns and John Young are SI leaders for Math 111 this semester. They will schedule sessions for your benefit.

Student tutors are available to help with homework problems. A schedule will be provided early in the semester. Use these additional oppotunities for help only at appointed times.

A few help sessions may be scheduled throughout the semester, as needed. Attendance is optional, and every effort will be made to schedule help sessions at times when a majority of the class can attend.

THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE. BY YOUR SIGNATURE ON SUCH WORK YOU PLEDGE THAT WORK WAS DONE IN ACCORDANCE WITH THE RULES STIPULATED ON THE WORK OR IN THIS SYLLABUS.

Mathematics 111
Fall, 1997

Class Calendar
with
Homework Assignments from the Textbook
and
Quiz Dates

<u>Wednesday, August 26</u>   **Review of Functions [P4 - P7]**

    p. 33: 3, 4; 5-19 (odd); 25, 27, 31, 33, 35, 43, 45, 47, 67, 73
    p. 44: 5, 7, 13, 17, 19, 21, 25, 33, 43, 45, 51; 61-71 (odd)
    p. 56: 9, 13, 15, 45, 47
    p. 64: 1, 5, 9, 13, 15; 19-27 (odd); 35, 37, 39, 45, 47, 49, 53, 55, 59, 61, 63, 65, 69, 71

<u>Friday, August 28</u>   **Review of Functions; Introduction to Calculus [1.1]; Limits [1.2]**

    p. 78: 1-7 (odd); 9-18 (odd)

<u>Monday, August 31</u>   **Limits [1.3 - 1.5]**

    p. 84: 1, 3, 19-31 (odd)
    p. 92: 1-19 (odd); 25-33 (odd); 37-40 (all)
    p. 102: 1-13 (odd); 15-19 (all)
    Quiz 1

<u>Wednesday, September 2</u>   **Continuity [1.5]**

    p. 102: 23-26 (all); 27-45 (odd); 49-52 (all); 57-60 (all)

Friday, September 4

Intermediate Value Theorem [1.5]; **Review**

    p. 102: 69, 73, 76, 88
    p. 112: 1-13 (odd); 17-23 (odd); 31, 33, 39, 40
    Quiz 2

Wednesday, September 9

Definition of Derivative, Tangent Line Problem, Differentiability [2.1]

    p. 122: 5-19 (odd); 43-49 (odd)

Friday, September 11

Basic Rules of Differentiation (the constant-multiple, sum, and difference rules; derivatives of powers, sine, cosine, and exponential functions) [2.2]

    p. 134: 1-37 (odd); 42-46 (odd); 47-57 (odd); 73, 75, 87, 89, 91, 97, 99
    Quiz 3

Monday, September 14

Product and Quotient Rules, Higher Order Derivatives [2.3]

    p. 145: 1-7 (odd); 11-19 (odd); 15-63 (odd); 69-83 (odd)

Wednesday, September 16

Chain Rule, Derivative of the Natural Logarithm Function [2.4]

    p. 155: 7-29 (odd); 41-73 (odd); 77-91 (odd); 103

Friday, September 18

Review of Differentiation

    p. 173: 1, 2; 5-39 (odd); 49, 51, 75, 76, 81
    Quiz 4

Monday, September 21

Review

    p. 112: 1-11 (odd); 19, 23, 31, 33, 39, 40

Wednesday, September 23

Review

Thursday, September 24

Test 1 at 7:45 a.m.

Friday, September 25

Implicit Differentiation [2.5]

    p. 163: 1-33 (odd); 37; 41-47 (odd); 51-55 (odd)

Monday, September 28   **Related Rates** [2.6]

    p. 170: 1-13 (odd); 14-22 (all); 25, 27, 28, 29, 31, 33, 37, 41, 43
    Quiz 5

Wednesday, September 30   **Extrema on an Interval** [3.1]
                                                        Mean Value Theorem [3.2]

    p. 182: 1, 3, 5; 11-19 (odd); 25, 27: 29-32 (all)
    p. 189: 27-37 (odd); 39-42 (all)

Friday, October 2   **Review**

    Quiz 6

Monday, October 5   **Graphing Concepts** [3.3, 3.4] **with Application
                                              to Polynomial Functions**

    p. 198: 1, 3, 5, 43, 51
    p. 206: 21, 25, 27; 51-57 (odd)

Wednesday, October 7   **Infinite Limits** [1.6]
                                                        Limits at Infinity [3.5]

    p. 111: 1-7 (odd); 11, 15; 19-41 (odd)
    p. 215: 9-31 (odd)
    Quiz 7

Friday, October 9   **Graphing Rational Functions** [3.5, 3.6]

    p. 215: 37-45 (odd)

Wednesday, October 14   **Graphs with Vertical Tangents, Other Types
                                      of Graphs** [3.6]

    p. 223: 1, 7, 13, 17, 19; 31-39 (odd)
    Quiz 8

Friday, October 16   **Review**

    p. 173: 57-73 (odd); 91
    p. 256: 5, 15, 19, 21, 23, 24, 25, 27, 31, 33, 43, 45, 47

Monday, October 19   **Review**

Tuesday, October 20   *Test 2 at 7:45 a.m.*

Wednesday, October 21   **Optimization** [3.7]

    p. 230: 3-31 (odd); 15-21 (all); 23-29 (odd); 32; 35-43 (odd)

Friday, October 23   **Applications to Business and
                                          Economics** [3.10]

    p. 254: 1-17 (odd); 25, 31, 43, 45

Monday, October 26   **Antiderivatives** [4.1]

    p. 268: 1-35 (odd); 43-51 (odd); 63, 65, 73
Quiz 9

Wednesday, October 28   **Linear Motion** [H]

    p. 268: 53-59 (all); 61, 71

Friday, October 30   **Review**

    Quiz 10

Monday, November 2   **Sums and Sigma Notation** [4.2]

    p. 279: 1-11 (odd); 15-23 (odd); 23-35 (odd); 39

Wednesday, November 4   **Definite Integral, Area** [4.3]

    p. 289: 1-7 (odd); 11-23 (odd); 39, 41

Friday, November 6   **Fundamental Theorem of Calculus** [4.4]

Graphing Portfolio due

    p. 301: 1-53 (odd); 54, 57
Quiz 11

Monday, November 9   **Integration by Substitition** [4.5, 5.1]

    p. 313: 1-6 (all); 7-77 (odd); 87; 93-99 (odd)

Wednesday, November 11

Integration by Substitution [5.1]
Introduction to Differential Equations,
Separation of Variables [5.4]

p. 341: 1-49 (odd); 57-60 (all); 67, 69, 71
p. 367: 1, 3, 5, 13, 17, 25, 27, 29; 39-59 (odd)
Quiz 12

Friday, November 13

Review

p. 257: 51, 53, 71, 75
p. 331: 5-19 (odd); 23, 25, 27; 33-45 (odd); 49, 55, 57, 63
p. 398: 1-17 (odd); 55-63 (odd)
Quiz 13

Monday, November 16

Review

Tuesday, November 17

Test 3 at 7:45 a.m.

Wednesday, November 18

Area Between Curves [6.1]

p. 409: 1, 3, 5; 13-23 (odd); 27, 29, 31, 35, 39, 41

Friday, November 20

Volumes of Revolution - Disk Method [6.2]

p. 420: 1, 3, 5; 9-31 (odd); 37, 39, 41
Quiz 14

Monday, November 23

Volumes of Revolution - Shell Method [6.2]

p. 429: 1-23 (odd); 33

Monday, November 30

Review of Area and Volume

p. 468: 7: 11-19 (odd); 27, 28

Wednesday, December 2

Course Review

Quiz 15

<u>Friday, December 4</u>   **Course Review**

<u>Monday, December 7</u>   **Course Review**

Final Examinations: <u>**8:00 class**</u>**: Thursday, December 10**
                                               9:00 a.m. - noon in Seney 215

                              <u>**9:00 class**</u>**: Thursday, December 10**
                                               7:00 - 10:00 p.m. in Seney 215