



Independent Study | in Idaho

**Math 170
Calculus I**

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Course Guide

Independent
Study | in Idaho

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Mathematics 170 Calculus I

University of Idaho
4 Semester-Hour Credits

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4 – Math 170

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Math 170: Calculus I

4 Semester-Hour Credits: UI

Welcome!

Whether you are a new or returning student, welcome to the Independent Study in Idaho (ISI) program. Below, you will find information pertinent to your course including the course description, course materials, course objectives, as well as information about assignments, exams, and grading. If you have any questions or concerns, please contact the ISI office for clarification before beginning your course.

Policies and Procedures

Refer to the ISI website at www.uidaho.edu/isi and select *About ISI Policies* for the most current policies and procedures, including information on setting up accounts, student confidentiality, exams, proctors, transcripts, course exchanges, refunds, academic integrity, library resources, and disability support and other services.

Course Description

Functions, limits, continuity, differentiation, integration, applications, differentiation and integration of transcendental functions. Primarily for students in engineering, mathematics, science or computer science. Prerequisite: Math 143 (with a grade of C or better) and Math 144 [Analytic Trigonometry] (concurrent enrollment in Math 144 is allowed although it is recommended that students complete Math 144 before enrolling in Math 170); or demonstrated proficiency through a sufficiently high score on the ACT, SAT, or math placement tests. UI students: may be used as general education credit in J-3-c. Carries 2 credits after Math 160. See *Class Placement* at <http://www.uidaho.edu/registrar/registration/placement/>. Polya Math Center unavailable for ISI students.

Exams are sent to proctors one at a time, once the instructor has completed grading applicable lessons. For example, Exam 2 sent after lessons 1-4 graded, Exam 2 after lessons 5-8, etc. Exceptions made upon written instructor approval.

12 graded assignments, 4 proctored exams

Students may submit up to 2 assignments per week. Before taking exams, students MUST wait for grades and feedback on assignments, which may take up to three weeks after date of receipt by the instructor.

ALL assignments and exams must be submitted to receive a final grade for the course.

Course Materials

Required Course Materials

- Stewart, James. *Single Variable Essential Calculus*. 2nd ed. Brooks/Cole, 2013. ISBN-10: 1133112765, ISBN-13: 9781133112761

Recommended Course Materials

- Stewart, James. *Single Variable Essential Calculus Student Solutions Manual*. 2nd ed. Brooks/Cole, 2013. ISBN-10: 1133490948, ISBN-13: 9781133490944

Course Delivery

All ISI courses are delivered through Canvas, an online management system that hosts the course lessons and assignments and other items that are essential to the course.

Course Introduction

This course is intended to give the student an understanding of the fundamental concepts of calculus. There are two main parts to Calculus I: differentiation and integration. Basically, differentiation extends the notion of the slope of a line to the slope of a curve and integration extends the notion of areas of polygons to areas of irregular, curved shapes. You are about to greatly expand your perception of mathematics. I hope you find this journey both exciting and rewarding.

Course Objectives

Upon successful completion of this course, the student will be able to:

- Calculate limits from graphs and by using limit laws.
- Determine where a function is continuous by using the concept of limits.
- Calculate derivatives using the limit definition and by using derivative rules.
- Calculate the derivative of functions defined implicitly.
- Apply differentiation to problems such as related rates, curve sketching, and optimization.
- Find antiderivatives of elementary functions and by using u-substitution.
- Use the Fundamental Theorem of Calculus to evaluate definite integrals.
- Calculate derivatives and antiderivatives with transcendental functions.
- Use conditional probabilities and independence to solve probability problems.
- Use models describing exponential growth and decay.
- Apply integration to problems of area and volume.

Lessons

Assignments

There are 12 graded assignments for this course, worth 10 points each. Only the top 10 assignments will be included in the final grade, for a total of 100 possible points.

Each lesson may include the following components:

- lesson objectives
- reading assignments
- practice problems
- lecture
- written assignment, project, or activity

Study Hints:

- Keep a copy of every assignment submitted.

- Complete all reading assignments.
- Set a schedule allowing for course completion one month prior to your personal deadline. An *Assignment Submission Log* is provided for this purpose.
- Web pages and URL links in the World Wide Web are continuously changing. Contact your instructor if you find a broken Web page or URL.

Refer to the **Course Rules** in Canvas for further details on assignment requirements and submission.

Exams

There are 4 exams for this course, 3 unit exams and 1 comprehensive final exam. The 3 unit exams are worth 100 points each, and the final exam is worth 200 points. The exams are worth a total of 500 points of the course grade.

- You must wait for grades and comments on assignments prior to taking subsequent exams.
- For your instructor's exam guidelines, refer to the **Course Rules** in Canvas.

Refer to *Grading* for specific information on assignment/exam points and percentages.

Proctor Selection/Scheduling Exams

All exams require a proctor. At least 2 weeks prior to taking your first exam, submit the completed *Proctor/Exam Request Form* (available at uidaho.edu/isi, under *Forms*) to the ISI office. ISI mails all exams directly to the proctor after receiving the *Proctor/Exam Request Form*. You must schedule the examination time with your proctor prior to each exam. The proctor administers the exam and returns it to the ISI office.

Grading

The course grade will be based upon the following considerations:

Assignments =	100 points
Exams 1-3 =	300 points
Final Exam =	200 points
Total =	600 points

The final course grade is issued after all assignments and exams have been graded.

Acts of academic dishonesty, including cheating or plagiarism are considered a very serious transgression and may result in a grade of F for the course.

About the Course Developer

Esther Klosterman has a strange history with mathematics. When she was younger, she didn't like math and worked through it with frustration and tears. However, during high school her attitude toward math started to change. When she took Calculus I (this very material) she began to really enjoy math. Her love for math grew and she graduated from the University of Idaho with a Masters in Mathematics. She hopes that whoever takes this course will enjoy it as she did.

Judi Terrio got her math ability from her father and her love of people from her mother. She grew up and went to college on the east coast. She got her secondary teaching certificate and taught a few years in Colorado before moving to the beautiful, northern Idaho region. In north Idaho, Judi taught high school for many years before moving to Moscow where she got her M.S. in mathematics and has been an instructor here ever since. She thinks she is one of the most fortunate people alive because her passion and her job are one in the same. She loves teaching! She is also a cat whisperer.

Contacting Your Instructor

Instructor contact information is posted in the ***Course Rules*** document on your Canvas site

Assignment Submission Log				
Send the completed <i>Proctor Information Form</i> to the ISI office at least two weeks prior to taking your first exam.				
Lesson	Projected Date for Completion	Date Submitted	Grade Received	Cumulative Point Totals
1				
2				
3				
4				
It is time to make arrangements with your proctor to take Exam 1.				
Exam 1				
5				
6				
7				
8				
It is time to make arrangements with your proctor to take Exam 2.				
Exam 2				
9				
10				
11				
12				
It is time to make arrangements with your proctor to take Exam 3.				
Exam 3				
It is time to make arrangements with your proctor to take Exam 4 (Comprehensive Final Exam).				
Exam 4				

Lesson 1

Limits

Lesson Objectives

- Finding limits from given graphs
- Finding limits using the limit laws

Reading Assignment

Optional

- Optional Diagnostic Tests A – D, pp. xvii - xxii
- Optional Module A, Functions
- Optional Chapter 1, sections 1 & 2, Functions
- Module 1, Limits
- Modules: <http://www.sci.uidaho.edu/polya/math170/modules/>

Required

- Sections 1.3 & 1.4. Skip “Precise Definition of a Limit” on pages 31 – 32.

Practice Problems

These are not to be handed in. They are for you to check your understanding of the material; to exercise our math brain. Make sure you attempt each problem without looking in the solutions manual. As I mentioned above, it is crucial for you to practice, to do math, and not just read about it. The answers to the self-study practice problems are in the back of the textbook and in the Student Solution Manual.

- Section 1.3 #3, 5, 7, 9
- Section 1.4 #1, 11, 15, 17, 21, 23, 25, 27, 37, 41, 43

Lecture

Diagnostic Tests

In the front of the book on pages xvii – xxii there are 4 diagnostic tests: A on Algebra, B on Analytic Geometry, C on Functions, and D on Trigonometry. Each of these tests gives you a chance to review the basic prerequisite skills needed to succeed in a calculus course. The answers to the diagnostics immediately follow each test. At the end of each set of answers, in a blue box, are the recommendations if you had difficulties with any of the diagnostics.

- For diagnostic tests A and B you are referred to the text book web site: www.stewartcalculus.com where you will find review material on Algebra and Analytic Geometry.
- For diagnostic test C you are referred to sections 1.1 and 1.2, pp. 1 – 20, in the text book for a review of functions. Also, for a comprehensive review of functions, I refer you to the University of Idaho (UI) module A on functions. This module will review all the fundamentals of functions that you will need in this course.

- For diagnostic test D you are referred to Appendix A at the back of the textbook, pp A1 – A10. I also recommend that you watch the UI Module B on Trigonometry. One of the prerequisites of this course is knowledge of trigonometry. It is interwoven throughout all the topics of calculus. Do not neglect a review of trigonometry, especially if your background in it is weak or if it has been a while since you studied it.

Section 1.3 The Limit of a Function and section 1.4 Calculating Limits

The notion of a limit forms the foundation for all of calculus. In section 1.3 you will consider limits intuitively, from a numerical viewpoint, and from a graphical viewpoint. Numerical investigations help develop your initial understanding of a limit, but quickly become both tedious and unreliable. In section 1.3 concentrate on the graphical problems. In section 1.4 you will study the techniques, rules, and laws for finding limits algebraically. You will find most the rules to be very intuitive. You will not be asked to list or identify specific laws, just be able to use them for finding limits.

If you have not yet looked at the UI modules, then this is the time to start. Module 1 on Limits is a very comprehensive lecture, complete with examples that cover the material presented in both of these sections. Pause and take notes, just as if you were watching the lecture in a class room; copy down the examples so you have them to use when you are doing the exercises. For future lessons, I may provide more examples and notes within this study guide, but for this lesson on limits, everything you need is contained in the first UI module and in the examples given in the textbook.

Written Assignment

Show all your work in a neat and organized manner or you will receive no credit. Good luck and have some fun! Treat yourself when you finish the lesson. Your labors deserve a reward. (16 problems)

- Section 1.3 #4, 8, 10
- Section 1.4 #12, 16, 18, 22, 24, 42, 44