

MATH 112: Calculus I

Winter 2020

Sections 1-6: MWF 10:00 AM – 10:50 AM, 3108 JKB

Sections 6-12: MWF 11:00 AM – 11:50 AM, 3108 JKB

Instructor Information:

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TA Information:

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Sections 11 and 12:	Xue Liu	xueliu@mathematics.byu.edu

Texts & Materials

Information about purchasing the textbook and the online homework program, WebAssign, is available at BYU's myBookList at <https://booklist.byu.edu/>. DO NOT PURCHASE these materials through another source; if you do so you may end up paying for the materials twice. The textbook for this course is an integrated e-textbook. The retail price for the course material has been negotiated by the department and is priced well below the national retail price. The department has searched online, and you will not be able to find a better price for purchasing both the textbook and WebAssign.

You should be able to access the digital textbook directly through a link found in Learning Suite or WebAssign, the online homework system (see the section Homework Assignments). Please note that there is NO physical book to purchase. Of course, you may always purchase a physical version of the book we are using if you want to, but you do not have to.

Course Description

Calculus is the foundation for most of the mathematics studied at the university level. The mastery of calculus requires well-developed skills, clear conceptual understanding, and the ability to model phenomena in a variety of settings. Math 112, Calculus 1, develops the concepts of limit, derivative, and integral, and is fundamental for many fields of mathematics, science, and engineering.

Prerequisites

Students are expected to know the material in Math 110 and 111 or the equivalent. This includes College Algebra and Trigonometry, but could also be satisfied with a good course in Precalculus. Students will also be required to take a diagnostic test in order to exhibit competency in these areas.

Diagnostic test in Webassign (required to move to chapter 2 homework)

Successful completion of Math 112 requires a solid background in both College Algebra and Trigonometry. In Webassign you will find a **Math 112 Diagnostic Test** that you must complete during the time that the class is going through the Chapter 1 review material. You must pass this Diagnostic Test with an 80% or better in order to move past Chapter 1 and access the Chapter 2 homework. You can attempt the test as many times as you want. If you have difficulty with a certain part of the Diagnostic Test, you should carefully review the corresponding section in Chapter 1 (or the Trigonometry section in Appendix D). It is recommended that you attempt the diagnostic test on the first day of class (or as early as possible), so that you can concentrate your studying.

If you cannot achieve a score of 80% or higher on the Diagnostic Test then you may not be prepared at this time for the challenging material in Calculus. Talk to your instructor about making plans to better prepare yourself to take Calculus another semester. You can switch from 112 to either Math 110 or Math 111 by the 12th school day of the semester. Talk to your instructor about how to do so.

Preparation time

Adequately prepared students should expect to spend a minimum of three hours of work for each credit hour, including one hour in-class and two hours out-of-class per credit. This adds up to a minimum of 12 hours per week for math 112. A minimal time commitment is likely to lead to an average grade, like a B-. More time may be required to completely master the content.

Written Homework Assignments

Written assignments will be due Mondays, Wednesdays, and Fridays at the beginning of the lecture. The assignments for each class period can be found in the accompanying homework schedule spreadsheet. Late homework will not be accepted. The lowest **six** homework scores will not be figured into your final grade, which is meant to accommodate for illness or other disruptions to your regular schedule that might prevent you from turning an assignment in on time.

Solutions should be clearly labeled and in order. The style of your written solutions should be very much like that of a textbook example. Solutions should contain enough explanation that one of your classmates would be able to easily understand what you have done. Generally, it is NOT adequate to merely write down a final answer.

Online Homework Assignments

Online homework will be done through WebAssign which can be accessed by going to the WebAssign homepage (<https://www.webassign.net/wa-auth/login>) and then entering in your Class Key which is given below and depends upon the section you are enrolled in. Make sure you use the correct Class Key for your section.

<u>Sections</u>	<u>Class Key</u>
1-6	byu 8134 5016
7-12	byu 0628 8717

The online portion of the homework is typically due at 11:59 PM the day after the material is covered in class. See webassign for exact due dates of specific assignments.

You are strongly encouraged to study together and work together on homework assignments (both written and online). However, you each must submit your own assignment. Everything you turn in should be in your own words, and you should thoroughly understand everything you write down or submit to the computer.

Common final exam

A common final exam is given to all students in all sections of Math 112. Please note that it WILL NOT BE at the regularly scheduled BYU final exam time for this class. Rather a single time will be scheduled for all sections of Math 112. The date and time of the final exam will be given later in the semester, once the University Registrar's office has scheduled it. Having a common final exam for all sections at the same time allows the Mathematics Department to assign grades fairly. The percentile ranking of each student relative to all students in all sections will be computed based on the final exam scores. Using this information the Calculus Committee will compute an average grade distribution for each section. It is department policy that the average grade for each section should match its average grade on the common final exam. No calculators, books, or notes will be permitted during the final exam.

Grading Policies

Your final grade will be determined as follows:

Online Homework will count for 15% of the final grade.

Written Homework will count for 120% of the final grade.

2 Midterm Exams will count for 40% of the final grade (20% each).

The final exam will count for 25% of the final grade.

GE Certification Area

This course is designed to fulfill the **Quantitative Reasoning requirement** of the Aims of a BYU Education which refers to: “Quantitative Reasoning—numerical abilities that equip students with the capacity to understand and explain the world in quantitative terms; to interpret numerical data; and to evaluate arguments that rely on quantitative information and approaches” (Aims, “Intellectually Enlarging”).

Quantitative Reasoning Learning Outcomes

1. The course should improve critical thinking and problem solving, especially as these apply to quantitative analysis.
2. The course should prepare students to identify and intelligently face problems they encounter later in life that require quantitative reasoning.

Math 112 Learning Outcomes

Differential and integral calculus

This course is designed for students majoring in the mathematical and physical sciences, engineering, or mathematics education and for students minoring in mathematics or mathematics education. Calculus is the foundation for most of the mathematics studied at the university level. The mastery of calculus requires well-developed skills, clear conceptual understanding, and the ability to model phenomena in a variety of settings. Calculus 1 develops the concepts of limit, derivative, and integral, and is fundamental for many fields of mathematics. This course contributes to all the expected learning outcomes of the Mathematics BS. For more detailed information, visit the Math 112 Wiki page.

Limits. Students will:

- Develop informal meanings for the limit concept.
- Compute limits (or determine non-existence) of functions described algebraically and graphically.

Derivatives. Students will:

- Know the limit definition of the derivative and interpret it as slope and rate of change.
- Use various differentiation rules to compute derivatives.

Definite and Indefinite Integrals. Students will:

- Know the limit of Riemann sums definition of the integral and interpret it as accumulation, area under a curve, and net change.
- Use geometry, the fundamental theorem of calculus, and u-substitution to compute integrals.

Applications. Students will use derivatives and integrals to solve common real-world problems, including:

- Optimization, related rates, approximation, and curve sketching for derivatives.
- Net change and area problems for integrals.

BYU Honor Code

In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university. Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and my own expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

Preventing Sexual Discrimination and Harassment

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment. BYU's policy against sexual harassment extends not only to employees of the university, but to students as well. If you encounter unlawful sexual harassment or gender-based discrimination, please talk to your professor; contact the Equal Employment Office at 422-5895 or 367-5689 (24-hours); or contact the Honor Code Office at 422-2847.

Students with Disabilities

Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the Services for Students with Disabilities Office (422-2767). Reasonable academic accommodations are reviewed for all students who have qualified, documented disabilities. Services are coordinated with the student and instructor by the SSD Office. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures by contacting the Equal Employment Office at 422-5895, D-285 ASB.