

AP Calculus

Overview

According to the American Heritage Dictionary, calculus is defined as, "a method of analysis or calculation using a special symbolic notation; the combined mathematics of differential and integral calculus." Until now, typically you have only been able to perform calculations on very simple shapes and objects, and under only the most perfect of conditions. Using limits, derivatives, and integrals, calculus will allow you to generalize the techniques and perform calculations that might otherwise be impossible. We can thank our "founding fathers" (shown at the right) for their efforts and diligence! (And they did it without calculators...amazing!) The course will be separated into four distinct areas: limits, derivatives, integrals, and preparation for the AP Exam. Typically, the first two items on the list occur first semester, and the last two complete the course second semester.



Isaac Newton
(1642-1727)



Gottfried Leibniz
(1646-1716)

Textbook

We will be using a textbook that is called "Calculus," authored by Finney, Demana, Waits, and Kennedy. Odd answers are available in the back of the book. I will assume, however, that often you will want to check all your work as well as the answers. From time to time, I will post complete solutions to our assignments on our classroom Blackboard page*. *I do not take class time to read answers to exercises from the textbook!* At times, I also will utilize worksheets to help reinforce certain concepts or techniques. I will provide solutions and/or answers to these supplements.

Required Daily Materials

- Textbook
- Binder to store notes, homework, and other papers (It helps to stay organized.)
- Graphing calculator-Preferably TI. (This is a requirement!)

Calculators: ***YOU NEED YOUR OWN GRAPHING CALCULATOR!***

I will assume you have a working knowledge of your graphing calculator. Additionally, I will be introducing some features that may be unfamiliar to you. My demonstrations usually will utilize a TI-83 (the TI-84 typically works the same way). It certainly is acceptable to use a different graphing calculator, but it may take some extra effort on your part to learn how to accomplish the same tasks on your graphing utility. I will do the best I can to assist you, and hopefully there will be others in the course who will be able to help as well.

Prerequisites

A student enrolled in AP Calculus should have a strong mathematics background (at least a C in Pre-Calculus) and **(more importantly) a willingness to put forth college-level effort.**

Tests and Quizzes

You can call them tests or quizzes...some quizzes may cover entire chapters, other chapters will be separated into several quizzes. Because of the varying amount of content involved on each quiz, the number of possible points earned on quizzes also will differ.

Homework and Daily Assignments

Homework typically has NOT been graded in this class. However, occasionally I will check in the assignments so I can assess your level of effort, but it may not count towards your overall grade. You must realize that since this is a college-level course, it is your responsibility to "stay on top of things." If you choose NOT to do the daily work, your chances of success in the class will MOST LIKELY be diminished simply because your quiz scores are almost always adversely affected. You need to decide how much work YOU need to do in order to earn a grade with which YOU are comfortable.

Absences

Please make sure you keep up with any work you miss due to any absences. It is imperative that you get together with someone else in the class, borrow notes, and complete the homework so you are adequately prepared for quizzes on that material, especially since you will have missed the initial lecture on that topic (not recommended!). Also, if you miss school on a quiz day, please *be prepared to take the quiz the day you return to school.* Obviously, that means you may miss new material (still not recommended!) if you are unable to take the make-up after school due to issues with my schedule or yours. However, some students have been known to abuse the attendance policy and consistently miss ONLY this class on quiz days. If this becomes an issue, I will address this with whoever is involved.

Final Exam

There WILL be a final exam at the end of first semester that EVERYONE will take. The exam will be a combination of written and multiple choice problems.

Final Grade

Your final grade in the class for each marking period will be based on the total points earned on your quizzes. Your first semester grade will be calculated using a 40-40-20 model averaging your grades from Quarters 1,2, and the final exam. The expectation in this class is that you will take the AP Exam in May. Since these scores are not available until mid-July, it is not possible to use this as part of your final grade. Your second semester grade will be an average of your grades from Quarters 3 and 4, *which are each shorter than the normal ten weeks because of the nature of the AP calendar.* If for some reason you do NOT take the AP Exam, you will be required to take a full-length, AP-style exam in class (including Senior Honor Project students), and then your grade will be averaged in the same manner as first semester.

***Instructor
Contact***

One Last Note

The fact that you made it this far into the mathematics program here at LCN is an indicator that you have the knowledge, skills, and ability to succeed in this class. Yes, Calculus may be challenging. But it just doesn't make sense to drop out of math after you've gotten this far, the year where you can potentially earn college credit. It will require work on both of our parts, but I am willing to do my share, and I trust you are prepared to do yours. I hope all of you will consider rising to meet this challenge. **However, remember that you will NOT be able to drop the class—your grades WILL become part of your GPA (taking the class credit/no credit is NOT an option).**

**Make a good choice for your future academic career,
and do what is necessary to be successful.**

Information

Ms. Linda Lovins

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School Phone: 586-493-5270

AP Central Website : www.apcentral.collegeboard.com

IMPORTANT DATE

AP CALCULUS EXAM

Usually the 1st Tuesday or Wednesday in May; 8:00 a.m.

Chapter 1 - Prerequisites for Calculus (We do not cover this chapter, but you may want to review these topics as needed.)

- Lines, functions, and graphs
- Exponential functions
- Trigonometric functions
- Logarithmic functions

Chapter 2 - Limits and Continuity

- Rates of change and limits
- Limits involving infinity
- Continuity
- Rates of change and tangent lines

Chapter 3 - Derivatives

- Definition and alternate form of the derivative
- Differentiability
- Rules for differentiation
- Velocity and acceleration
- Derivatives of trigonometric functions

Chapter 4 – More Derivatives

- Chain rule
- Implicit differentiation
- Derivatives of inverse trigonometric functions
- Derivatives of exponential and logarithmic functions

Chapter 5 - Applications of Derivatives

- Extreme values of functions
- Mean Value Theorem
- Connecting f' and f'' with the graph of f
- Optimization
- Newton's Method
- Related rates

Chapter 6 - The Definite Integral

- Estimating with finite sums (Riemann sums)
- Trapezoidal rule
- Definite integrals and antiderivatives
- Fundamental Theorem of Calculus

Chapter 7 - Differential Equations and Mathematical Modeling

- Integration by substitution
- Integration by parts
- Exponential growth and decay
- Slope fields

Chapter 8 - Applications of Definite Integrals

- Integrals as net change
- Areas in the plane
- Volumes

Chapter 9

- Indeterminate forms and L'Hôpital's Rule

Content

The content covered in Calculus AB generally is the equivalent of the entire first semester and the beginning of second semester college calculus. We will cover all or parts of Chapters 2 through 8. Chapters 2 through 5 (limits, and differential calculus) will be completed first semester, and second semester will cover Chapters 6 through 8 (integral calculus).