Advanced Placement (AP) Calculus AB Syllabus
2024-25 School Year

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Prerequisite: Algebra 1, Geometry,
Algebra 2 (which includes analytic geometry and logarithms),
Pre-Calculus (which includes trigonometry)

Major Text: Calculus for AP® 2e edition by Ron Larson and Paul Battaglia

Overview

AP® Calculus AB satisfies all the requirements designed by the College Board and is equivalent to two semesters of college level calculus. This course syllabus is aligned to the AP Calculus AB Course and Exam Description (CED) released by the College Board in 2019. Students enrolled in this course have completed precalculus and have chosen to take AP Calculus AB. Students are required to take AP Calculus AB Exam on May 12, 2025.

The course is designed around the three "Big Ideas" of calculus, including:

Big Idea #1: Change
Big Idea #2: Limits
Big Idea #3: Analysis of Functions

The College Board's CED is broken down into 8 units, and my course follows the sequencing/pacing of these 8 units. The three big ideas of calculus are included in the units as reflected in the CED.

UNIT 1: Limits and Continuity (~3 weeks)

UNIT 2: Differentiation: Definition and Fundamental Properties (2–3 weeks)

UNIT 3: Differentiation: Composite, Implicit, and Inverse Functions (2–3 weeks)

UNIT 4: Contextual Applications of Differentiation (~3 weeks)

UNIT 5: Analytical Applications of Differentiation (3–4 weeks)

UNIT 6: Integration and Accumulation of Change (~5 weeks)

UNIT 7: Differential Equations (2–3 weeks)

UNIT 8: Applications of Integration (3–4 weeks)

Student Practice

Throughout each unit, **Topic Questions** will be provided to help students check their understanding. The Topic Questions are especially useful for confirming understanding of difficult or foundational topics before moving on to new content or skills that build upon prior topics. Topic Questions can be assigned before, during, or after a lesson, and as in-class work or homework. Students will get rationales for each Topic Question that will help them understand why an answer is correct or incorrect, and their results will reveal misunderstandings to help them target the content and skills needed for additional practice.

At the end of each unit or at key points within a unit, **Personal Progress Checks** will be provided in class or as homework assignments in AP Classroom. Students will get a personal report with feedback on every topic, skill, and question that they can use to chart their progress, and their results will come with rationales that explain every question's answer. One to two class periods are set aside to re-teach skills based on the results of the Personal Progress Checks.

An extra lab period each week is devoted to an appropriate calculator activity, multistep word problems, Topic Questions, Personal Progress Checks, and/or free-response questions (FRQ's) from released AP Calculus AB Exams. Emphasis is placed on problem solving, using the calculus in new settings, and helping students to see the connections among the big ideas and the major themes in calculus. FRQs, which emphasize real-world applications of the calculus, are selected for discussion during this lab period.

The course is also designed around the four Mathematical Practices in AP Calculus outlined in the 2019 CED including:

Practice #1: Implementing Mathematical Processes

Practice #2: Connecting Representations

Practice #3: Justification

Practice #4: Communication and Notation

Course Objectives

At the end of the course, students should be able to solve a variety of real-world problems using limits, derivatives, integrals, and series. Students are shown the interrelationships of these four major themes/threads throughout the course. The course teaches the students how to communicate their mathematical reasoning using proper mathematical terminology in complete sentences. Students are instructed how to answer problems in the context of the problem, both verbally and in written sentences/paragraphs, using appropriate measurement units.

Technology

- All students are expected to have a TI-84, or 84+ for their use in class and for homework assignments. For students that cannot afford a calculator, our school will loan a TI 84+ calculator to that student for the course.
- All students in our school system have been issued a Chromebook during high school years.
- The graphing calculator is used every day in class and students are instructed daily on how to use this technology to help them understand the various calculus concepts and to connect concepts and different representations.
- Students are instructed throughout the course of the Four Functionalities allowed on the AP Exam with the graphing calculator including:

  - *Plot the graph of a function within an arbitrary viewing window.*
  - *Find the zeros of functions (solve equations numerically).*
  - *Numerically calculate the derivative of a function.*
  - *Numerically calculate the value of a definite integral.*

- I instruct students on the various software packages to illustrate volumes of solids, slope fields, and accumulation.
- During the course, problems will be represented and solved in four distinct ways: analytically, numerically, graphically, and verbally. Students will use a graphing calculator to determine the value of various limits, to determine the value of a derivative at a point, to find the value of a definite integral, to graph a function in various windows, and to solve a variety of equations, as well as explore concepts such as the limit of a function at a point.

Assessment

Our school system's grading policy is follows:

        45% - Major Assessments (Unit tests)

        20% - Minor Assessments (Quizzes)

        15% - Home/Daily Work

        20% - Cumulative Assessment (Final exam)

Unit summative assessments are given at the end of each unit, with formative assessments throughout the unit. Students will be asked to not only 'solve' a problem but also write explanations of their process to certain problems. Most assessments will mimic the AP exam with 50% calculator use and 50% non-

calculator use. Included in these assessments will be AP exam type questions. This course includes a cumulative exam at the end of each semester.

Test Retake Policy
- Two major assessments per semester (not quiz)
- Tutoring and/or test corrections/error statements REQUIRED.
- Retest before or after school ONLY!

Mock Exam: This exam is a full length practice exam that will be given in one sitting during the school day some time to be determined in the spring.

AP Calculus AB exam: The College Board sponsors this exam, which is used by most colleges to award credit. This course will prepare you for this exam. It is expected that all students take this exam on Monday, May 12, 2025.   To learn more about this exam, visit www.collegeboard.com/ap. Further information will be forthcoming in class.

College Board Online Registration & Resources

*AP Exam timeline:
- 8.23.24 – Deadline for students to electronically join all AP classes on College Board website (APcentral.collegeboard.org). *Help line for students and parents 1-888-225-5427
- ***Students must fix College Board issues. This can not be done administratively. ***
- 10.25.24 – Deadline for students to register for AP exams on the College Board website.

Monitoring your progress: Students are responsible for knowing their progress throughout the course. There should be no surprises. The school allows access to the Infinite Campus gradebook system through the student portal. Parents are encouraged to use the parent portal as well. Both the student and parent will have access to all grading.

Classroom rules: It is expected without exception that you treat me and your fellow classmates with utmost respect. You will be expected without exception to receive that respect in return. Being prepared is the best way to start a class, so being on time, getting materials ready and having your questions from the prior night's assignment will ensure a great start. My time is valuable as your time is as well. When something is due, it is expected to be handed in on-time.   Any work handed in must be done in pencil and legible, no exceptions. I value integrity in a person. Integrity means doing the right thing, even when no one is watching. So with that said, I do NOT tolerate cheating. You will get a zero (0) and will be expected to call home to inform your parents what you did. Have faith in your own work! ABSOLUTELY NO FOOD in classrooms!! Students cannot bring food to share or make food to share!!!

Canvas: To encourage blended learning, online assignments will be posted through Canvas. The assignments from Canvas will be graded and entered in Infinite Campus automatically. Students should be familiar with how to navigate the online platform, communicate with their teacher, and submit assignments on time. If there are technology limitations, please notify the teacher.

Chromebook: All students are issued a district-provided chrome book for instructional purposes, student engagement, and student learning. Chrome book use is at the direction and discretion of the classroom teacher.

AP CALCULUS AB
2024-25
Dr. Ma

By signing below I acknowledge that I received, read, and understand Dr. Ma's AP Calculus AB Syllabus.

I understand that I, as an advanced placement student, am responsible for registering online for my exams. Failure to do so will mean that I am unable to participate in AP testing for this course during the current school year.

The school is responsible for meeting College Board deadlines regarding testing registration. Once I have chosen to test/not test and submitted my registration through the College Board website, I am responsible for any fees incurred should I later change my decision.

Student:

_____   _____
Student Name (Print)   Class Period

_____   _____
Student Signature   Student email

Parent/Guardian:

_____   _____
Parent/Guardian Name (Print)   Parent/Guardian Phone Number*
                                                                    * Please include your email address and the <u>best</u> phone
                                                                    number at which to contact you after 3:00 pm.

_____   _____
Parent/Guardian Signature   Parent email