Advanced Placement (AP) Calculus AB Syllabus
2022-2023 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 of a Single Variable (advanced) 8th edition
by Larson, Hostetler and Edwards, 2006, Houghton Mifflin Company

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 and BC 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 AB Calculus. Students are required to take AP Calculus AB Exam in May. If
students cannot afford to pay for the exam, the school will pay for the exam.

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-83, 83+, 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 exposed to numerous calculus applets during the course, and I have a computer and LCD projector in my classroom.
- Students download a number of calculator programs from my calculator, including programs for Riemann Sums, Area between two curves, Euler’s Method, and Slope Fields. These programs are designed to help students visualize the various concepts and to get a deeper understanding of calculus.
- 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.

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. Students are responsible for payment of the AP exam. It is expected that all students take this exam on Monday, May 8th, 2023. To learn more about this exam, visit [www.collegeboard.com/ap](http://www.collegeboard.com/ap). Further information will be forthcoming in class.

AP Exam timeline:
- ✓ 8.26.22 – 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
- ✓ 10.28.22 – Deadline for students to register for AP exams on the College Board website.
- ✓ 2.10.22 – Deadline to pay all AP exam fees.

AP Fees

Paid Students:
- $97.00 per exam

Free and Reduced lunch students:
- First exam regardless of course is paid for by GADOE and is free of charge to the student.
- Additional exams for FR students are $54 each.

STEM exams
- For students who do not qualify for College Board fee reduction, GADOE will pay for one AP STEM exam for each student enrolled in an AP STEM course.

Exams ordered after ordering deadline:
- $40 fee per exam regardless of free and reduced lunch/STEM status.

Cancel or fail to take AP exam after ordering deadline:
- $40 fee per exam regardless of free and reduced lunch/STEM status.

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. Please encourage parents 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!

**Google Classroom:** To encourage blended learning, online assignments will be posted weekly through Google Classroom. At least one Google Classroom assignment per week will be graded and entered in Infinite Campus. 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

**Dr. Ma**

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

| TI 84 Plus Silver Edition calculator #: ____________ | Calculus Book bar code #________________________ |

### 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 best phone number at which to contact you after 3:00 pm.

| Parent/Guardian Signature | Parent email |