

Advanced Placement (AP) Calculus Syllabus

Moanalua High School, 2018-2019
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Course Description and Expectations

AP Calculus is a one-year course in college-level calculus. There are two levels of AP Calculus: AB, which covers one semester of college calculus; and BC, which covers two semesters of college calculus.

AP Calculus AB and BC may be considered the most rigorous mathematics courses offered at Moanalua High School; as such, students who enroll in these courses must have performed well and retained the knowledge and skills learned in all previous mathematics courses. Additionally, these students must be willing and able to invest a large quantity of time and effort in order to succeed in their studies. Students who are unable to do so often find themselves struggling throughout the year, even if they had success in their previous mathematics courses.

A considerable amount of the learning in this course is conducted online through the course website and videos available on EDpuzzle and YouTube. Students who are not able to access the materials online must make alternate arrangements, or consider withdrawing from the course.

Quarters 1-3 are spent learning new material. (BC students are also responsible for lessons during the fall, winter, and spring breaks.) Quarter 4 is spent with content review and preparations for the AP Calculus exam. All students enrolled in this course must take the AP Calculus exam.

Classroom Rules of Conduct

My expectation is that students will conduct themselves as responsible young adults at all times. Some specific policies to note include:

- Students must sit in their assigned seat.
- Students must use proper language in class. Swearing and use of derogatory terms will not be tolerated.
- Students may use electronic devices (e.g., cell phones, laptops, tablets) in class with prior teacher permission and for educational purposes only. Otherwise, students will have their electronic devices confiscated and turned in to a vice principal.
- Students may consume food and beverages, but all trash must be thrown away in the trash cans.
- Students are allowed to use the microwave, as long as it is kept clean.
- Students who wish to use the restroom must sign out and in, and must have the restroom pass present with them while outside. If the restroom pass is lost, the responsible student must pay a \$5 replacement fee.

If these expectations are not followed, then any of the following consequences may occur:

- Verbal warning
- Seating assignment change
- Student-teacher conference during non-instructional time
- Parent-teacher conference by phone or in-person
- Referral to administration

Academic Honesty

Students are expected to always act in an ethical, academically honest manner. Students who cheat, plagiarize, or perform any other dishonest act will be reported to administration for disciplinary action.

Students who cheat on an assessment will be required to take a make-up assessment. While the make-up assessment will cover the same material, it may include more difficult problems.

Course Website (<http://www.jnagaoka.net>)

I regularly update my course website with a course calendar, list of homework assignments, digital copies of handouts, links to online resources, and other files. Students who lose any handouts must print their own from the course website; I do not make extra copies.

Required School Supplies

All of the following supplies are required, and will not be provided in class—students must bring their own:

- Planner or assignment book
- Three-ring binder
- Folder paper or notebook
- Graph paper (store-bought or printed from online)
- No. 2 pencils and erasers
- Ballpoint pen with black or dark blue ink
- Ballpoint pen with red ink (or alternate color)

A three-hole paper punch, stapler, tape dispenser, and electric pencil sharpener are all available in class for student use. You do not need to ask permission to use these, but you should not interrupt class while doing so.

Textbook Information

The resources and assignments for this course are primarily based on the following textbooks:

- *Calculus for AP* by Larson & Battaglia. © 2017 Cengage Learning.
- *Calculus, AP Edition*, 9th ed. by Larson & Edwards. © 2010 Houghton Mifflin.
- *Taylor Polynomials and Infinite Series*, 6th ed. by Goldstein. © 2015 Benjamin Goldstein.
- Previously administered AP Calculus exams. © The College Board.

Class copies of *Calculus, AP Edition*, 9th ed. are available in limited quantities. It is not required to sign out a textbook, though it is available as an option for interested students with no outstanding financial obligations. The cost of this textbook, if lost or irreparably damaged, is \$225.

Students who receive a textbook are responsible for its upkeep. They must write their name (in ink) on the inside cover, along with the school year (2018-2019), teacher name (Mr. Nagaoka), and classroom number (G-102).

Also, they must cover their textbook with a book cover. The cover must be labeled (in ink) with their name and course subject. The book cover is not to be taped or glued to the textbook.

A textbook check will be scheduled once every quarter, for a period of one week (five school days). During this week, students must present their textbook during non-class hours. The textbook must be properly covered, with correct annotations on the inside cover. Students who fail to present their textbook during the allotted time will receive a financial obligation for the full cost of the textbook. This obligation will be cleared upon proper completion of the textbook check.

Students will be charged the full cost of the textbook if:

- The textbook is lost or is not returned at the end of the year or when withdrawing from the course;
- The textbook is damaged and cannot be used by another student; or
- The number on the textbook is altered.

Students will be charged a partial cost of the textbook if:

- There are pen or pencil markings in the textbook; or
- There are damages such as torn pages, stains, water damage, dirt marks, etc.

Graphing Calculators

A set of TI-Nspire CX CAS graphing calculators is available in class for student use. Students are required to submit an identification card in order to borrow a graphing calculator. The ID card will be returned when the graphing calculator is returned.

Use of a graphing calculator is required in this course. While students are not required to own their own graphing calculator, it is highly recommended that they do so. Recommended graphing calculators to purchase include the TI-Nspire, TI-Nspire CX, TI-Nspire CAS, or TI-Nspire CX CAS. Other suitable calculators include the TI-83, TI-84, and TI-89, though these models have different capabilities and designs from the TI-Nspire family of graphing calculators.

Note: All of the graphing calculators mentioned above may be used during SAT and AP exams. All except the TI-89, TI-Nspire CAS, and TI-Nspire CX CAS may be used during ACT exams.

Graphing calculators generally cost around \$100 to \$150. Different stores and online vendors offer different prices, so it is highly recommended to check around for the best price before purchasing. In past years, Amazon.com often has offered the best price.

Some assessments may either require or allow for student use of graphing calculators, while other assessments may prohibit their use. Note that the TI-89, TI-Nspire CAS, and TI-Nspire CX CAS have extra capabilities, due to their embedded “computer algebra systems” (CAS). As such, in lower-level courses, some assessments where a graphing calculator is required or allowed may be labeled “non-CAS calculators only.” No such restrictions are placed on assessments in Calculus or AP Calculus.

Online graphing calculators and graphing calculator applications on cell phones, computers, and tablets may not be used in lieu of actual graphing calculators during assessments, because their ability to store notes, pictures, and access the Internet can allow students to cheat. These websites and programs, however, may be useful for completion of classwork, homework, and projects. Some suggested alternatives include:

- Desmos is a free online graphing calculator (<http://www.desmos.com>). It is relatively easy to use, though watching the how-to videos is recommended. Students who are adept at using Desmos, however, must still learn how to use an actual graphing calculator, or they will be at a disadvantage during assessments.
- The TI-Nspire for iPad application (\$29.99) is a cheaper alternative to purchasing an actual TI-Nspire graphing calculator. There are two available options when purchasing—a non-CAS version that mimics a TI-Nspire CX, and a CAS version that mimics a TI-Nspire CX CAS. While the application works very similarly to the actual graphing calculator, note that iPads may not be used during assessments.

Tutorial and Office Hours

Tutorial periods are designated times when teachers are to make themselves available for students who need additional assistance. The times are listed below:

A1 days:	2:51 p.m. to 3:25 p.m.	C3 days:	2:01 p.m. to 3:05 p.m.
A3 days:	2:51 p.m. to 3:25 p.m.		

Tutorial periods are “optional” because they occur after the last class period of the day. While students are not required to remain on campus, they are encouraged to stay and see their teachers for help.

Office hours are designated times in addition to the Tutorial periods when I make myself available for students who need additional assistance. Typically, office hours are offered from 3:25 p.m. to 5:00 p.m. daily.

If any schedule conflicts occur with ample warning, I make every attempt to announce these changes in class and on the course website. Please note, however, that there are times when meetings run late, impromptu meetings are called, or other unforeseen events occur that prevent me from being available during my normal office hours.

Lectures and Note Taking

For most lessons, I present lecture material online through videos on EDpuzzle and YouTube. This is a modern method of teaching called “flipping” the classroom, where students take notes at home prior to class; class time is used for guided instruction and answering questions. Students are expected to watch all videos on EDpuzzle. I am able to review which videos they have watched and which they have not watched.

Students are expected to take detailed notes on the lectures. PDF files of the video slides are available on the course website; some students choose to print them out for note taking. Alternatively, students should take notes on folder paper (keeping their papers organized in a binder) or in a notebook.

Notes should be neat and organized. Hard-to-read notes are hard-to-understand notes! While taking notes, students are encouraged to write down what I say, as well as what is written in front of them. When writing down the steps to procedures, include the reasons why certain steps are done—this will help in conceptual understanding. It may be helpful to use highlighters or colored pens/pencils for this.

Students should also write down their own thoughts—jot down a summary of the lesson at its completion, as well as any questions regarding concepts that might still be hard to understand. These are topics that can jump start a good class discussion.

Students should regularly review notes from past lessons, even if those sections were already tested. Older material is still important, and assessments can always include review questions.

Homework Policy

Homework consists of assigned practice problems, which students are to attempt prior to class in pencil. Solutions to the homework problems are available on the course website; students are expected to check their own solutions and make corrections in red (or alternate color) ink. Students should not erase any of their incorrect work.

While not graded nor collected, homework is checked at the beginning of each class to determine whether it was completed, and I do note if students are missing their homework.

Homework assignments completed after the due date may be submitted during non-instructional time and will be counted as late. Late homework assignments will not be accepted after a certain date each quarter, which will be announced in class well in advance. When totaling the number of missing homework assignments for the quarter, each late assignment will count as “half missing” (2 “late” assignments = 1 “missing” assignment).

Students who miss class due to absences (whether excused or unexcused) are responsible for submitting their missing homework assignments during non-instructional time. If the submission is made within two school days of their return, the assignment will not be marked as late.

Assessment Policy

Quizzes cover material similar to those seen in the lessons and homework. Quizzes are typically 40-75 minutes long in time allotted, covering several lessons that were taught in the weeks prior. Material from previously assessed sections may also be included—these will be announced in advance.

Projects allow students to write about mathematics and further investigate concepts learned. Projects often incorporate opportunities to create new products. Projects may include both individual and small group portions. All projects are mandatory; students who fail to submit a project will receive an automatic F for the term.

Cumulative exams are given at the end of each quarter, and cover material from the beginning of the school year up to the present moment in time. Cumulative exams are given in multiple parts over several days. Each part is typically 55-75 minutes long in time allotted, encompassing an entire class period.

Gateway exams are short 5-20 minute exams given each quarter, covering basic facts, formulas, and rules that must be memorized. Gateway exams are pass/fail, with qualifications varying each quarter. Once a student passes a particular quarter's gateway exam, it is considered "passed" for the entire school year.

All students will be given that quarter's gateway exam once in class. Students who do not pass their gateway exam on the first try have a limited number of retakes that they may attempt. Each student is limited to one retake attempt per day during non-instructional time. Students will not be allowed to retake that quarter's gateway exam after a certain date each quarter, which will be announced in class well in advance. The number of retakes allowed is based on the score from their first try. (This is incentive to do well on the first attempt.)

- Student scores 50.0 percent or greater: Maximum of four retakes
- Student scores 25.0 to 49.9 percent: Maximum of three retakes
- Student scores 0.0 to 24.9 percent: Maximum of two retakes

Students who would otherwise earn an A, B, or C but fail to pass that quarter's gateway exam will have their grade for the term dropped by one letter. Furthermore, such students will need to pass the failed gateway exam in subsequent quarters, or their grade will be dropped accordingly. Students who need to retake old gateway exams can do so up to two times in a quarter.

AP practice exams consist of multiple choice and free response sections from past AP Calculus exams. The majority of Quarter 4 is spent taking such practice exams. Each full-length exam is scored according to AP rubrics and on the AP 1-5 scale. Students are also required to take a full-length practice exam (8 a.m. to 12 p.m.) on a date to be determined in March.

Use of Electronics During Assessments

All assessments are closed notes. Some assessments require the use of a graphing calculator, while other assessments prohibit their use.

Use of cell phones, computers, and tablets is prohibited during assessments. Because they are easily concealed and may be utilized to cheat during assessments, students must turn in all cell phones and MP3 players prior to the start of each assessment. Students will be allowed to claim their electronic devices at the conclusion of the assessment.

Make-Ups for Assessments Missed Due to Absence

Students who miss assessments due to absences (whether excused or unexcused) will be allowed to make-up the missed assessment within three school days of their return. (Extensions can be granted on a case-by-case basis for students who have extended absences.) Make-up assessments will cover the same course material as the missed assessment, but may be structured differently.

Students who need to make-up a missed assessment must make an appointment with me. These make-up assessments can be administered during Tutorial periods and designated office hours. Appointments may not be rescheduled on the day of the make-up assessment. Students who miss their appointment will not be allowed to make-up the missed assessment.

Grading Rubric

All student work is aligned to the AP Calculus Concept Outline, and is graded on the following 0-4 rubric:

- 4 = the student's understanding exceeds the learning objective
- 3 = the student's understanding meets the learning objective
- 2 = the student's understanding approaches the learning objective
- 1 = the student is working toward understanding of the learning objective
- 0 = the student has no understanding of the learning objective

Note that a score of 4 does not equate to an A, nor does a score of 2 equate to a C. These are levels of understanding of concepts. Receiving a score of 2 on every assessment equates as failure, as it means not one concept has been understood. A score of 3 or higher is considered a "passing" score.

Certain learning objectives may be flagged as "priority"—that is, the content covered by those learning objectives is extremely important or foundational. Students who fail to "meet" or "exceed" all priority learning objectives cannot earn a grade higher than a C.

Determining Grades with Learning Objectives (Quarters 1-3)

At the end of the quarter, all assessments from the beginning of the school year are utilized in the determination of a student's grade. A score (based on the 0-4 rubric) is given for each learning objective, based on the results throughout the year. Recency and consistency are two important factors in the determination of these learning objective scores.

Once learning objective (LO) scores are determined, a letter grade is determined according to the following rubric:

To earn an A: At least 70% of LO scores must be 4s; AND
At least 90% of LO scores must be 3s or higher; AND
At least 100% of LO scores must be 2s or higher; AND
All priority LO scores must be 3s or higher; AND
All projects submitted.

To earn a B: At least 75% of LO scores must be 3s or higher; AND
At least 95% of LO scores must be 2s or higher; AND
At least 100% of LO scores must be 1s or higher; AND
All priority LO scores must be 3s or higher; AND
All projects submitted.

To earn a C: At least 60% of LO scores must be 3s or higher; AND
At least 80% of LO scores must be 2s or higher; AND
No more than 1 zero is allowed; AND
All projects submitted.

To earn a D: At least 35% of LO scores must be 3s or higher; AND
All projects submitted.

The letter grade is always cumulative from the beginning of the school year. As such, quarter grades are not averaged to determine a semester grade, and semester grades are not averaged to determine a year grade.

Student-teacher conferences are held on Exam Day, where students will each receive a printed report with letter grade and learning objective scores. I will also meet with each student to go over the report in detail. At this time, I will explain if the student has the opportunity to raise their grade.

Learning objective (LO) make-ups are held during Exam Week office hours, during which students may attempt to raise the scores of some learning objectives. Each LO make-up will consist of a problem of my creation, aligned with that particular learning objective. The student gets one attempt to solve the problem; they may not get a replacement problem, and may not reattempt the LO make-up if they are unsuccessful. All rules regarding assessments (e.g., closed notes, no use of technology, etc.) apply to LO make-ups as well.

LO make-ups are allowed only for students who are on the borderline of raising their grade. I define "borderline" as within 10% of the minimum criteria for the next highest grade. Students who are more than 10% away from the minimum criteria for the next highest grade will not be allowed to attempt LO make-ups.

Students who successfully raise their grade by one letter may not make any additional attempts; grades cannot be raised by two or more letters. Students who are unsuccessful at any of their LO make-ups may not make any additional attempts; once a LO make-up is unsuccessful, the student can no longer raise their grade.

The opportunity to attempt LO make-ups is a privilege, and there are several ways that students can lose this privilege:

- Watching less than 75% of the class videos (excluding introductions) on EDpuzzle; or
- Missing three or more homework assignments by the end of the quarter; or
- Missing two or more assessments due to unexcused absences; or
- Having an unexcused absence on Exam Day; or
- Cheating on an assessment.

Determining Grades with AP Practice Exams (Quarter 4)

The majority of Quarter 4 is spent taking AP practice exams. These are old AP Calculus exams, each of which is scored according to AP rubrics. A score of 1.00 will be given to students who earn zero points on an exam, while a score of 6.00 will be given to students who earn the maximum of 108 points on an exam. A sliding scale, based on that exam's scoring guidelines, will be used to award scores in-between.

Furthermore, the results from learning objectives (Quarters 1-3, plus any LO-based quarter 4 assessments) will also be converted to a similar 1.00 to 6.00 scale, based on the percent of learning objectives passed.

The scores obtained from the AP practice exams and the score obtained from learning objectives will be combined to determine a final grade, which will count for Quarter 4, Semester 2, and the Year.

To earn an A: Score of 5.00 to 6.00
To earn a B: Score of 4.00 to 4.99
To earn a C: Score of 3.00 to 3.99
To earn a D: Score of 2.00 to 2.99
To earn an F: Score of 1.00 to 1.99

Failure Letter

A failure letter will be given to students during Exam Week if their grade is an F. The student will be required to write a response explaining why they earned an F, and a parent/guardian signature will be required before the quarter ends.

Failing students may still have a chance to perform LO make-ups to raise their grade to a D if certain stipulations are met, which will be detailed in the failure letter.

Students who have a passing score (3 or higher) on less than 15% of learning objectives will not be allowed to perform LO make-ups to raise their grade to a D under any circumstances.

Jupiter Ed (<https://login.jupitered.com/login/?10584>)

Students (and their parents/guardians) may monitor their performance in the course via Jupiter Ed. Information regarding completion of assignments and results of assessments are included online.

A letter grade update will be posted after every assessment, at mid-quarter, and at the end of the quarter. Plus and minus signs will be used to indicate if the letter grade is "high" or "low" in the range.

Students who have a drop in grade due to priority LOs results will see a grade of C+ on their grade updates. A comment attached to the grade update will state what the student's grade would be if the priority LO issue were rectified.

AP Calculus Exam

The AP Calculus exam for the 2018-2019 school year will be held on Tuesday, May 14, 2019 at 8:00 a.m. All students enrolled in AP Calculus are required to take the AP Calculus exam.

Students are responsible for paying for this AP exam (and any others they may be taking). The cost for each 2018 AP exam was \$94; the price may be different for the 2019 exams. A discounted price is usually offered to students who are participants in the Free or Reduced Price Lunch Program. Announcements will be forthcoming in spring 2019 with payment details and deadlines. Students who fail to submit payment for their AP exams in a timely manner will receive a financial obligation.

All AP exams are scored on a 1-5 scale, where a score of 3 is considered "qualified." Note that students who take the BC exam receive two scores—an overall BC score, and an AB subscore (excluding problems that are covered in BC but not in AB). Students can access their scores online starting in July.

College Credit via the AP Calculus Exam

Students who receive a score of 3 or higher on an AP exam may possibly earn college credit at their institution of choice. At times, no credit may be awarded, but the institution may choose to waive a course or placement exam requirement. Each institution may determine its own criteria for awarding credit. Students may look up various institutions' policies online: <https://apstudent.collegeboard.org/creditandplacement/search-credit-policies>

The University of Hawai'i at Mānoa's policy for the AP Calculus exam (effective March 16, 2018), along with course descriptions of their calculus offerings, are posted below.

AP Exam	Score	Credits Earned
Calculus BC	4 or 5	Math 251A and Math 252A
	3	Math 251A
Calculus AB	4 or 5	Math 251A
	3	No credits earned. A student may enroll in either Math 203, Math 215, or Math 241.

While credit is awarded for the 251A-253A sequence, students who wish to continue their pursuit of calculus studies may do so in the 241-244 sequence.

Courses	Title	Description
Math 203	Calculus for Business and Social Sciences (3 cr)	Basic concepts; differentiation and integration applications to management, finance, economics, and the social sciences.
Math 215	Applied Calculus I (4 cr)	Basic concepts; differentiation, differential equations and integration with applications directed primarily to the life sciences.
Math 216	Applied Calculus II (3 cr)	Differential calculus for functions of several variables and curves, systems of ordinary differential equations, series approximations of functions, continuous probability, exposure to use of calculus in the literature.
Math 241	Calculus I (4 cr)	Basic concepts; differentiation with applications; integration.
Math 242	Calculus II (4 cr)	Integration techniques and applications, series and approximations, differential equations.
Math 243	Calculus III (3 cr)	Vector algebra, vector-valued functions, differentiation in several variables, and optimization.
Math 244	Calculus IV (3 cr)	Multiple integrals; line integrals and Green's Theorem; surface integrals, Stokes's and Gauss's Theorems.
Math 251A	Accelerated Calculus I (4 cr)	Basic concepts; differentiation with applications; integration. Compared to 241, topics are discussed in greater depth.
Math 252A	Accelerated Calculus II (4 cr)	Integration techniques and applications, series and approximations, differential equations, introduction to vectors.
Math 253A	Accelerated Calculus III (4 cr)	Vector calculus; maxima and minima in several variables; multiple integrals; line integrals, surface integrals and their applications.