



Santa Ana Unified School District

CENTURY HIGH SCHOOL

California Distinguished School

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AP Calculus AB Course Syllabus

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Welcome! With much enthusiasm and high expectations for all students, I welcome you to your math class, AP Calculus. This syllabus is designed to explain this course and what your responsibilities are. Please keep this sheet as a reference for the remainder of the course.

It is important that every student plans their home schedule to complete assignments and to review/study daily. It is equally important that every student attends class regularly (students who miss school, miss out!).

Course Description

This full year course meets every day and covers all material as prescribed in the College Board course description. A College Board approved graphing calculator is required for the course and will be used regularly as a tool for discovery and for confirmation of analytic work. The course material is equivalent to a five hour of college Calculus course including the branches of single variable differential and integral calculus. A multi-representational approach is used throughout the course. Students are expected to take the advanced placement test administered in May.

The textbook that will be used in this course is Finney, Demana, Waits, Kennedy and Bressoud. *Calculus, AP Edition*, Fifth Edition. Pearson, 2016.

Course Objectives

1. Students will understand the fundamental concept of limits and be able to:
 - define and calculate limits for function values and apply the properties of limits
 - find and verify end behavior models for various functions and identify asymptotes
 - find the intervals over which a function is continuous
 - apply the Intermediate Value Theorem
 - calculate instantaneous and average rates of change
 - write the equations of tangent and normal lines to a curve at a specified point
2. Students will understand techniques of differentiation and be able to:

- find derivatives using the definition of the derivative
- graph f' from the graph of f (or from tabular data), and sketch f from the graph of f'
- identify where functions are not differentiable and classify discontinuities
- use differentiation rules to calculate derivatives (products, quotients, trigonometric functions and their inverses, exponential and logarithmic functions, etc.)
- apply the chain rule to calculate derivatives of functions, parametric functions and implicit functions
- use derivatives to solve problems involving rates of change.

3. Students will understand applications of differentiation and be able to:

- determine the local or global extremes of a function
- apply the Mean Value Theorem and find intervals on which a function is increasing or decreasing
- find points of inflection and determine concavity of a function by analyzing the second derivative
- solve problems involving minimization or maximization of functions
- find linearizations of nonlinear functions
- solve related rate problems

4. Students will understand techniques of integration and will be able to:

- use approximation methods (rectangular, trapezoidal) to estimate the area under a curve
- compute the area under a curve using a numerical integration procedure
- apply rules for definite integrals and find the average value of a function
- apply the Fundamental Theorem of Calculus to functions and graphs
- compute indefinite and definite integrals by the method of substitution and other methods
- solve differential equations using separation of variables
- use Slopefields to represent solutions to differential equations

5. Students will understand applications of integration and be able to:

- solve problems by integrating a rate to determine net change
- use integration to calculate areas of regions in a plane
- use integration to calculate volumes of solids by cross-sections, discs, and washers
- use integration and limits to evaluate improper integrals
- adapt their calculus knowledge to model problems involving rates of change in a variety of applications

Course Pacing

Semester 1(80 days)

Chapter 2 Limits & Continuity (11days total)

- 2.1 Rates of Change and Limits
- 2.2 Limits Involving Infinity
- 2.3 Continuity
- 2.4 Rates of Change and Tangent Lines, and Sensitivity

Chapter 3 Derivatives (20 days total)

- 3.1 Derivative of a Function
- 3.2 Differentiability
- 3.3 Rules for Differentiation
- 3.4 Velocity and Other Rates of Change
- 3.5 Derivatives of Trigonometric Functions

Chapter 4 more Derivatives (16 days total)

- 4.1 Chain Rule
- 4.2 Implicit Differentiation
- 4.3 Derivatives of Inverse Trigonometric Functions
- 4.4 Derivatives of Exponential and Logarithmic Functions

Chapter 5 Applications of Derivatives (34 days total)

- 5.1 Extreme Values of Functions
- 5.2 Mean Value Theorem
- 5.3 Connecting f' and f'' with the Graph of
- 5.4 Modeling and Optimization
- 5.5 Linearization, Sensitivity, and Differentials
- 5.6 Related Rates

Semester 2(83 days)

Chapter 6 The Definite Integral (23days total)

- 6.1 Estimating with Finite Sums
- 6.2 Definite Integrals
- 6.3 Definite Integrals and Antiderivatives
- 6.4 Fundamental Theorem of Calculus
- 6.5 Trapezoidal Rule

Chapter 7 Differential Equations & Mathematical Modeling (20 days total)

- 7.1 Slope Fields and Euler's Method
- 7.2 Antidifferentiation by Substitution
- 7.3 Antidifferentiation by Parts

- 7.4 Exponential Growth and Decay
- 7.5 Logistic Growth

Chapter 8 Applications of Definite Integrals (17 days total)

- 8.1 Accumulation and Net Change
- 8.2 Areas in the Plane
- 8.3 Volumes
- 8.4 Lengths of Curves.
- 9.2 L'Hopitals Rule

Expectations

Behavior

Students are expected to:

- Follow all school and district rules as stated in the student handbook
- Be in class and ready to work at the sound of the tardy bell
- Bring the appropriate materials and books to every class meeting as stated below
- Show respect for classmates and teacher at all times

Consequences will be enforced if behavior is not met.

First Occurrence- Counsel the student/parent communication (note/phone call)

Second Occurrence- Detention to be served at the teacher's convenience within one week of the infraction/parent communication (note/phone call)

Third Occurrence- Referral to Assistant Principal

Supplies

Every student will be required to have the following items every day:

- Issued textbooks
- Paper (ruled, 8 1/2" X 11")
- One 3-ring binder, you will be taking notes on loose-leaf paper and kept in this binder. You must complete all homework on loose-leaf paper.
- Writing Utensils. All of your homework and classwork should be completed in pencil unless I tell you otherwise. I will **not** accept work done in pen
- Graphing Calculator. A TI-84 Plus graphing calculator will be necessary in this course and may prove helpful in future math courses. Although a class set will be provided, it is recommended to have the calculator at home for practice and assignments

Textbooks and graphing calculators will be issued to each student and it is the responsibility of the student to properly maintain the condition of the book and/or calculator. In the event if student loses or damages the issued textbook and, the student will be financially responsible to replace it to the school.

Grading Policy – Every student starts with an “A”

The Academic Grade represents the student's level of mastery of mathematical concepts and how well the student demonstrates the use of these concepts to solve problems. During the semester each student will receive a grade of: A, B, C, D, or an F determined by the average of all tests, presentations, quizzes, projects, completed class/homework assignments, notes and semester final. The final grade will consist of the following distribution:

- Semester Final Exam (AP Exam) = 15%
- Test = 20%
- Quiz = 25%
- Assignments = 30%
- Project = 10%

The semester final letter grade will be determined by the following amount of percentage points:

- 89.5%-100% = A
- 79.5%-89.4% = B
- 69.5-79.4% = C
- 59.5-69.4% = D
- 59.4% or below = F

Exams including semester final, chapter quizzes, and midterm tests. These exams are designed to assess and monitor student progress. All exams must be completed in pen ink or will not receive a grade. All make-ups on exams are allowed only with excused absences. Students fail to make up their exam within one week will receive a score of zero. NO EXCEPTIONS!!!

Homework and notes will be assigned every class meeting. Homework will be due by the following class. All work must be completed on time and be done in pencil with proper headings in order to receive credit.

I RESERVE THE RIGHT TO USE ATTENDANCE, AND OTHER NONOBJECTIVE CRITERIA IN DETERMINING FINAL GRADES.

Make-Up Work and Absences

Only students with excused absences may make up missed work. It must be made up in a timely manner—one day for each day of absence. Any make-up work must be accompanied by the attendance office readmit verifying that the absence was not truancy. Individual tests may be made up at teacher's discretion. No make-ups on the daily quizzes.

DISCLAIMER: *I retain the right to modify the contents of this syllabus at any time during the school year*