

Required Materials:

Text: Calculus Graphical, Numerical, Algebraic, 3rd AP Edition

Calculator: TI-89, TI-Nspire, or TI-84

Extra Batteries: for the calculator (4 AAA)

3-Ring Binder or Spiral Notebook: For Homework and Classwork

Composition Notebook: Students are required to take notes and keep them organized.

Scoring Components

- **SC1** The course teaches all topics associated with Functions, Graphs, and Limits as delineated in the Calculus AB Topic Outline in the AP Calculus course description.
- **SC2** The course teaches all topics associated with Derivatives as delineated in the Calculus AB Topic Outline in the AP Calculus course description.
- **SC3** The course teaches all topics associated with Integrals as delineated in the Calculus AB Topic Outline in the AP Calculus course description.
- **SC4** The course provides students the opportunity to work with functions represented graphically.
- **SC5** The course provides students with the opportunity to work with functions represented numerically.
- **SC6** The course provides students with the opportunity to work with functions represented analytically
- **SC7** The course provides students with the opportunity to work with functions represented verbally.
- **SC8** The course teaches students how to explain solutions to problems orally.
- **SC9** The course teaches students how to explain solutions to problems in written sentences.
- **SC10** The course teaches students how to use graphing calculators to help solve problems.
- **SC11** The course teaches students how to use graphing calculators to experiment.
- **SC12** The course teaches students how to use graphing calculators to interpret results and support conclusions.

Course Goals:

By successfully completing this course, students will learn the following skills:

- Work with functions represented in a variety of ways, graphically, numerically, analytically, and verbally, and understand the connections among these representations.
- Understand the meaning of the derivative in terms of a rate of change, and local linear approximation, and use derivatives to solve a variety of problems.
- Understand the relationship between the derivative and the definite integral.
- Communicate mathematics both orally and in well-written sentences to explain solutions to problems.
- Model a written description of a physical situation with a function, a differential equation, or an integral.
- Use technology to help solve problems, experiment, interpret results, and verify conclusions.
- Determine the reasonableness of solutions, including sign, size, relative accuracy, and units of measurement.
- Develop an appreciation of calculus as a coherent body of knowledge and as a human accomplishment.
 - The graphical representations of the functions will be followed by an explanation (by the student)
 - Group work includes the students working on problems related to the topics described above. Each group then will present their findings.
 - Students will be asked to solve problems on the whiteboard as part of the class participation grade. As they are solving the problems, they will be asked to walk the class through the steps in order to strengthen vocabulary and verbal skills.
 - Graphing calculators will be used in class on daily bases to analyze the behavior of functions based on graphs and tables, find numerical approximations of integrals, find solutions to equations using numerical methods, etc...

AP Calculus Exam:

Thursday, May 5, 2016

AP Calculus AB Exam Breakdown:

Section I:

Consists of 45 multiple-choice questions

Part A: 28 questions- DOES **NOT** ALLOW THE USE OF A CALCULATOR.

Part B: 17 questions- REQUIRES A GRAPHING CALCULATOR FOR **SOME** QUESTIONS.

Section II:

Consists of 6 Free-response problems

Part A: 2 questions- **REQUIRES** A GRAPHING CALCULATOR

Part B: 4 questions- DOES **NOT** ALLOW THE USE OF A CALCULATOR.

AP Exam College Credit:

Colleges vary in what score they will accept for credit. Generally a student needs to score at least a 4 for credit, but some schools will accept a 3. Check with the schools you are applying to for details.

Grading:

Exams	60%
Tests	40%
Quizzes	20%
(1 lowest score for the quiz is dropped)	

Homework	20%
(No late work)	

Class Participation	20%
----------------------------	------------

Exams:

The Tests and Final will be a 50 minute exams covering the topics discussed in class and reading assignments from the book. The quizzes are 20 minute exams that will be given on weekly bases. There will be a notice in class and on my website at least one day before any quiz and one week before any test/ final.

Homework:

Homework will be assigned every day, including at home reading and practice problems. Homework will be due the next day and there will be no late work accepted.

Class Participation:

Students are responsible for solving problems in class (in some cases the students will have to come to the board). Class discussion will allow the students the opportunity to share ideas and knowledge of the subject.

Only assignments with WORK SHOWN will be credited. NO LATE WORK ACCEPTED!!!

1st Semester

Chapter 1: Prerequisites for Calculus

- 1.1 Lines
- 1.2 Functions and Graphs
- 1.3 Exponential Functions
- Extension: Parent Functions and Their Graphs
- Extension: Conics
- 1.5 Functions and Logarithms
- 1.6 Trigonometric Functions

Chapter 2: Limits and Continuity

- 2.1 Rates of Change and Limits
 - Graphically
 - Analytically
 - Numerically
- 2.2 Limits Involving Infinity
 - Graphically
 - Analytically
 - Numerically
 - How it relates to asymptotic behavior
 - How to evaluate by comparing relative magnitudes of functions
- 2.3 Continuity
 - Intermediate Value Theorem
 - Extreme Value Theorem
 - Using the limit definition of continuity to show functions (usually piecewise) are continuous
- 2.4 Rates of Change and Tangent Lines
 - Instantaneous Rate of Change vs. Average Rate of Change

Chapter 3: Derivatives

- 3.1 Derivative of a Function
 - Graphically
 - Analytically
 - Numerically – See Worksheet (Instantaneous Rate of Change)
 - Introduction to Slope Fields
- 3.2 Differentiability
 - Graphically
 - Analytically
 - Numerically
- 3.3 Rules for Differentiation
- 3.4 Velocity and Other Rates of Change
 - Graphically
 - Analytically
- 3.5 Derivatives of Trigonometric Functions
- 3.6 Chain Rule
- 3.7 Implicit Differentiation
- 3.8 Derivatives of Inverse Trigonometric Functions
- 3.9 Derivatives of Exponential and Logarithmic Functions

Chapter 4: Extreme Values of Functions

- 4.1 Extreme Values of Functions
 - Absolute vs. Relative
- 4.2 Mean Value Theorem
 - Graphically
 - Analytically
 - Numerically
- 4.3 Connecting f' and f'' with the Graph of f
 - Using graph of f' to determine properties of f
- 4.4 Modeling and Optimization
- REVIEW FOR FINAL EXAM
- 1st SEMESTER FINAL EXAM

2nd Semester

- 4.5 Linearization and Newton's Method
- 4.6 Related Rates

Chapter 5: The Definite Integral

- 5.1 Estimating with Finite Sums
 - Riemann Sums
 - Left, Right, and Midpoint approximations o Graphically o Numerically
- 5.5 Trapezoidal Rule
- 5.2 Definite Integrals
 - Basic Properties
- 5.3 Definite Integrals and Antiderivatives
 - Average Value of a Function
- 5.4 Fundamental Theorem of Calculus
 - Used to Evaluate Definite Integrals
 - Used in the definition of function o Graphically o Analytically o Numerically

Chapter 6: Differential Equations and Mathematical Modeling

- 6.1 Antiderivatives and Slope Fields
 - Solving differential equations using initial conditions
- 6.2 Integration by Substitution
- 6.4 Exponential Growth and Decay
 - Using differential equations in context
 - Separate and Integrate

Chapter 7: Applications of Definite Integrals

- 7.1 Integral as Net Change
 - Displacement vs Distance Traveled
 - Integral of a Rate of Change gives accumulated change.
- 7.2 Areas in the Plane
- 7.3 V olumes
 - Solids with known cross sections
 - Solids of revolution
- Disc Methodo Washer Method o Shell Method

Chapter 8: L'Hopital's Rule, Improper Integrals, and Partial Fractions

- 8.1 L'Hopital's Rule
- 8.2 Relative Rates of Growth
- REVIEW FOR AP EXAM (Every waking moment you have)
- 2nd SEMESTER FINAL EXAM