

## AP Calculus AB (Fall & Spring Semesters) 2011-2012

**TEACHER:** Raju Patel  
**ROOM:** S

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**Text: Calculus: Graphical, Numerical, Algebraic, Scott Foresman/Addison Wesley**

Each student will be assigned a textbook and will be held financially responsible if it is not returned at the end of the school year, cost: approximately \$60 -\$65. Bring your book to class every day.

*Curricular goals interwoven throughout the mathematics program are that students will:*

*learn to communicate mathematically*

*learn to use mathematics in their daily lives*

*become proficient with appropriate computational tools and techniques*

*learn to reason mathematically*

*become mathematical problem solvers*

**Materials Covered:** Chapters 2-4 will be covered in the fall and Chapters 5-7 will be covered in the spring.

### **Chapter 2: Limits and Continuity (pp. 54-93)**

**15 days**

- an intuitive understanding of the limiting process
- calculating limits using algebra
- estimating limits from graphs or tables of data
- understanding asymptotes in terms of graphical behavior
- describing asymptotic behavior in terms of limits involving infinity
- comparing relative magnitudes of functions and their rates of change
- understanding continuity in terms of limits
- geometric understanding of graphs of continuous functions (Intermediate Value Theorem and Extreme Value Theorem)
- derivative presented geometrically, numerically and analytically
- derivative interpreted as an instantaneous rate of change
- slope of a curve at a point
- tangent line to a curve at a point and local linear approximation
- instantaneous rate of change as the limit of average rate of change
- approximate rate of change from graphs and tables of values

### **Chapter 3: Derivatives (pp. 94-175)**

**30 days**

- estimate limits from graphs or tables of data
- derivative presented geometrically, numerically and analytically
- derivative interpreted as an instantaneous rate of change
- derivative defined as the limit of the difference quotient
- relationship between differentiability and continuity
- corresponding characteristics of graphs of  $f$  and  $f'$
- slope of a curve at a point
- tangent line to a curve at a point and local linear approximation
- instantaneous rate of change as the limit of average rate of change
- approximate rate of change from graphs and tables of values
- equations involving derivatives
- use of implicit differentiation to find the derivative of an inverse function

- interpretation of the derivative as a rate of change in varied applied contexts, including velocity, speed and acceleration
- knowledge of derivatives of basic functions, including power, exponential, logarithmic, trigonometric and inverse trigonometric functions
- basic rules for the derivative of sums, products, and quotients of functions
- chain rule and implicit differentiation

#### **Chapter 4: Applications of Derivatives (pp. 176-245)**

**25 days**

- geometric understanding of graphs of continuous functions (Intermediate Value Theorem and Extreme Value Theorem)
- slope of a curve at a point
- tangent line to a curve at a point and local linear approximation
- relationship between the increasing and decreasing behavior of  $f$  and the sign of  $f'$
- the Mean Value Theorem and its geometric consequences
- equations involving derivatives
- corresponding characteristics of graphs of  $f$ ,  $f'$  and  $f''$
- relationships between the concavity of  $f$  and the sign of  $f''$
- points of inflection as places where concavity changes
- analysis of curves, including the notions of monotonicity and concavity
- optimization, both absolute (global) and relative (local) extreme
- modeling rates of change, including related rates problems
- interpretation of the derivative as a rate of change in varied applied contexts, including velocity, speed and acceleration
- antiderivatives following directly from derivatives of basic functions
- finding specific antiderivatives using initial conditions, including applications to motion along a line

#### **Chapter 5: The Definite Integral (pp. 246-301)**

**26 days**

- derivative defined as the limit of the difference quotient
- computation of Riemann sums using left, right and midpoint evaluation points
- definite integral as a limit of Riemann sums over equal subdivisions
- basic properties of definite integrals
- applications of integrals
- use of the Fundamental theorem to evaluate definite integrals
- use of the Fundamental Theorem to represent a particular antiderivative, and the analytical and graphical analysis of functions so defined
- antiderivatives following directly from derivatives of basic functions
- finding specific antiderivatives using initial conditions, including applications to motion along a line
- numerical approximations to definite integrals

#### **Chapter 6: Differential Equations and Mathematical Modeling (pp. 302-361)**

**20 days**

- equations involving derivatives
- interpretation of the derivative as a rate of change in varied applied contexts including velocity, speed and acceleration
- geometric interpretation of differential equations via slope fields and the relationship between slope fields and derivatives of implicitly defined functions
- numerical solution of differential equations using Euler's method
- applications of integrals

- use of the Fundamental Theorem to evaluate definite integrals
- use of the Fundamental Theorem to represent a particular antiderivative, and the analytical and graphical analysis of functions so defined
- antiderivatives following directly from derivatives of basic functions
- antiderivatives by substitution of variables (including change of limits for definite integrals, parts, and simple partial fractions (nonrepeating linear factors only))
- solving separable differential equations and using them in modeling. In particular, studying the equation  $y' = ky$  and exponential growth
- solving logistic differential equations and using them in modeling
- applications of integrals
- finding specific antiderivatives using initial conditions, including applications to motion along a line

### **Chapter 7: applications of Definite Integrals (pp. 362-415)**

**21 days**

- slope of a curve at a point
- tangent line to a curve at a point and local linear approximation
- definite integral as a limit of Riemann sums over equal subdivisions
- definite integral of the rate of change of a quantity over an interval interpreted as the change of the quantity over the interval
- applications of integrals
- use of the Fundamental Theorem to evaluate definite integrals
- finding specific antiderivatives using initial conditions, including applications to motion along a line

**MATERIALS NEEDED:** To be prepared for class daily, the following materials are needed:

- Three-ring binder, four dividers, Filler Paper, Pencils – *For daily work, no pens please.*
- Graphing calculator TI-84

**GRADES:** Grading will be done on a point system. Points will be given for homework, quizzes, tests, labs, projects, and other activities. **YOU MAY FIND YOUR AVERAGE AT ANY TIME ON ENGRADE.COM.**

**Grading Scale:** Please refer to student/parent handbook for the school grading scale

40% -In-Class Assignments and Homework (including notebooks)

15% -Exams

30% - Quizzes

15% -Final Exam

LATE WORK WILL BE GRADED 50% OFF and will not be graded after two days from the due date.

### **Weekly Quizzes**

As a rule, we have a short quiz at the end of each week. The quizzes will ask you basic questions about what we covered that week, in order to keep you on top of the material as we move through the semester.

***HOMEWORK:*** Homework will be assigned on a daily basis. It is extremely important that you complete each assignment. It is your responsibility to complete the homework daily and come prepared to class with any questions on the material. Homework will be checked daily using the following scale: "5" if most or all of it has been attempted; "3" if about half has been attempted; and "0" if less than half has been attempted. **HOMEWORK WITHOUT WORK SHOWN IS GRADED AS IF YOU DID NOT DO IT!!!**

**Make-Up Work:**

It is the responsibility of the student to request make-up work **IMMEDIATELY** after returning to school from an absence. Students have three (3) school days to complete and submit make-up work to teachers. Make-up work will not be given after three (3) or more days have passed without the student requesting make-up work. For personal days, please refer to student handbook.

**EXAMS:** In the case of absence, students must arrange with the teacher to make up a test within one week of the student's return to school. Make-up tests will be supervised and maintain the same time allowance as the original exam. These make-up tests must be scheduled during regular school hours with either the teacher or the Resource Director. Students will not be permitted to miss classes in order to make up a test. Teachers may, at their discretion, require the student to take a different version of the test than the one originally given.

**Teacher Tutorial Date:**

If you have questions you may call or text Mr. Patel at 404-384-0753. If leaving a message please state your name and question. Mrs. Limor will also be available for help on Monday's 5<sup>th</sup> period, Wednesday's 8<sup>th</sup> period, and Thursday's 7<sup>th</sup> period.

**Academic Integrity Policy**

The development of a sense of personal integrity and responsibility in our students is an important goal for our teaching efforts. Students at Temima High School are expected to submit work for evaluation that has been completed solely by that student, unless group assignments have been so designated. The following actions are considered to be violations of academic integrity: using or receiving unauthorized materials in a test situation, passing on test answers and/or questions to someone who has not taken the test, turning in work for credit that is not the student's own (i.e. gross plagiarism). If a student is found to be in violation of the academic policy, the following measures should be taken: The student will receive a zero on the assignment and will not be allowed to complete the same. The teacher will inform the parent/guardian. Additional disciplinary action may be taken by the administration if warranted.

**BEHAVIOR:** School is for learning and this is our first priority. Any behavior that obstructs learning in the classroom will not be tolerated. Examples include: off topic conversations while teacher is teaching a lesson or when others students are asking questions. My classroom rules are as follows:

Come to class **prepared** to work.

Be on **time**.  
Be **respectful** of all.  
Always **try** your best.

**All guidelines in the Student Handbook also apply in my classroom.**

**CONSEQUENCES:** Please note student handbook on discipline

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**I have read and reviewed this course syllabus with my child**

\_\_\_\_\_  
Parent Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Student Name (Print)