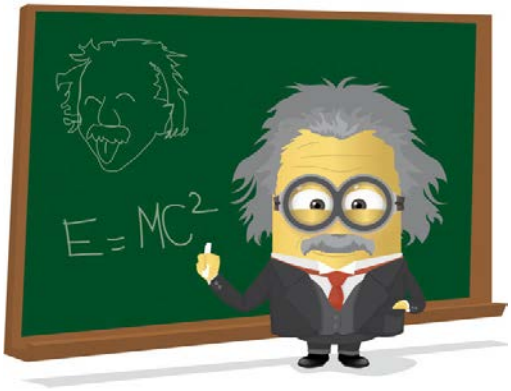

Welcome to AP Calculus AB

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AP Calculus AB Exam ($95)
Tuesday, May 4, 2021 @ 8:00AM

Welcome

This is going to be an interesting year for us all! Although the start of the academic school year has been pushed back to September 7th, we are going to begin our course on Monday, August 17 as originally scheduled so we don't lose three weeks of instruction. We will continue to use the FLIPPED CLASSROOM environment through flippedmath.com. We will start with a live classroom session on August 17th to get everyone acquainted with the class and go over the course. The first three weeks will include a Summer Review Packet, and an introduction to Limits. I will collect assignments at the end of each week during the first three weeks. We will then start daily live sessions on Monday, September 7th.

Online Instruction

Students will be required to attend the Google Meet (or Zoom) class each day with their webcams turned on. This will be an INTERACTIVE class. I want to be able to see your face and ask you questions just like a normal classroom. Be prepared to have your mics turned on. Attendance will be taken, and work will be supervised during the entire class period. Students are not allowed to show up to online classes wearing their pajamas. They must be sitting at a table/desk not lying on a bed. During lecture time I expect full participation. No headphones, cellphones, etc. allowed during lecture time. Feel free to have something to drink, but students should not be eating during lectures. Once the lectures are over, we will do classwork, activities or games. I will keep the Google Meet open for the duration of the hour and watch you work on Calculus. You may not work on any other class during our online class period. The only exception to that is if you have submitted your worksheets for the entire Unit and are ready for a test. If you miss a class for any reason YOU are responsible for finding out what you missed. Assignments must be made up within 24 hours of your return to school.

How to submit your work

All work must be submitted through the Google Classroom. Most assignments will be PDF files available for download with solutions to the problems online. I also will include video solutions of my own work so you can follow along while working on the problems. Students may write directly on the PDFs using DocHub (or any similar program) and then submit directly to the Google Classroom. I recommend purchasing a stylus that works with your chromebook or electronic device. Students may also print out each assignment and do the work with paper and pencil. Those assignments though must then be scanned and submitted. I recommend using a phone app called Adobe Scan. You can scan each document and then merge them into one PDF for submission. DO NOT send multiple JPGs or PDF files of your work. DO NOT send your work to me through email. It **must** be submitted directly to our Google Classroom.

Tests

Our primary test day is Thursday but may change depending on the schedule that week. Refer to our class calendar for upcoming test dates. You may retake **two** tests per semester and I will keep the higher score in the gradebook.

Classwork/Homework
These assignments are shorter than the math analysis topics and should be completed within one day (that includes watching the video lecture). There is a pacing guide on our class calendar so you can stay on task. The assignments are due the day after it is posted. For example if I post an assignment for Tuesday, you should turn it in on Wednesday. PLEASE DO NOT FALL BEHIND! Some assignments will require printing out and the use of scissors, rulers, protractors, etc.

Text

Larson, Hostetler and Edwards *Calculus: Early Transcendental Functions*: 4th Edition. Houghton Mifflin College Publishing, 2007. We will use our book as a supplement to the material on flippedmath.com. I will also integrate supplemental videos, activites and worksheets from larsoncalculus.com, Kuta Math, Kahn Academy and the AP Central website. Please pick up a copy of the book from the school office (We will start using the book after September 7th).

Class prerequisites
Students must pass Math Analysis with a B- or higher. If you have not met this requirement you must fill out a petition form from the school office.

Materials required for "On Campus" instruction
When/If we return to campus the course will continue very similar to the online class environment, with the obvious exception that you can now be with your friends YAY! Please bring a pencil or pen, your Calculus book (with a book cover) and a TI-83 or better scientific calculator. You may bring a Chromebook, laptop, tablet, or iPad to access our online content. This is a privilege not a right. Do not work on other class assignments during our class. If you are using your device for anything other than the topic at hand you will no longer be allowed to use it.

Calculator Policy
I will be teaching from a TI-84 Plus and a TI-83 emulator. I recommend purchasing the TI-84 Plus calculator for this course. Please save your link cords because we will also download and install programs from ticalc.org onto your devices. There are many apps available for use on iPhones and Androids, but none are allowed on the AP at this time. Students will be taught how to use the calculator to help solve problems, experiment, interpret results, and support conclusions. The graphing calculator will be needed for presentations, classwork, homework, and on some but not all tests. It is a requirement for parts of the Advanced Placement exam. We will use the calculator in a variety of ways including:

- Conduct explorations
- Graph functions within arbitrary windows
- Solve equations numerically
- Analyze and interpret results
- Justify and explain results of graphs and equations

Grading Policy

- ✓ Classwork & Homework – 15%
- ✓ Tests – 60%
- ✓ Final – 25%

A	93-100	B	83-86	C	73-76	D	63-66
A-	90-92	B-	80-82	C-	70-72	D-	60-62
B+	87-89	C+	77-79	D+	67-69	F	under 60

Unit 0 - Calc Prerequisites (Summer Work)

0.1 Summer Packet

Unit 1 - Limits and Continuity

1.1 Can Change Occur at an Instant?

1.2 Defining Limits and Using Limit Notation

1.3 Estimating Limit Values from Graphs

1.4 Estimating Limit Values from Tables

1.5 Determining Limits Using Algebraic Properties

1.6 Determining Limits Using Algebraic Manipulation

1.7 Selecting Procedures for Determining Limits

1.8 Determining Limits Using the Squeeze Theorem

1.9 Connecting Multiple Representations of Limits

Mid-Unit Review - Unit 1

1.10 Exploring Types of Discontinuities

1.11 Defining Continuity at a Point

1.12 Confirming Continuity Over an Interval

1.13 Removing Discontinuities

1.14 Infinite Limits and Vertical Asymptotes

1.15 Limits at Infinity and Horizontal Asymptotes

1.16 Intermediate Value Theorem (IVT)

Review - Unit 1

Unit 2 - Differentiation: Definition and Fundamental Properties

2.1 Defining Average and Instantaneous Rate of Change at a Point

2.2 Defining the Derivative of a Function and Using Derivative Notation

2.3 Estimating Derivatives of a Function at a Point

2.4 Connecting Differentiability and Continuity

2.5 Applying the Power Rule

2.6 Derivative Rules: Constant, Sum, Difference, and Constant Multiple

2.7 Derivatives of cos(x), sin(x), e^x, and ln(x)

2.8 The Product Rule

2.9 The Quotient Rule

2.10 Derivatives of tan(x), cot(x), sec(x), cot(x)

Review - Unit 2

Unit 3 - Differentiation: Composite, Implicit, and Inverse Functions

3.1 The Chain Rule

3.2 Implicit Differentiation

3.3 Differentiating Inverse Functions

3.4 Differentiating Inverse Trigonometric Functions

3.5 Selecting Procedures for Calculating Derivatives

3.6 Calculating Higher-Order Derivatives

Review - Unit 3

Unit 4 - Contextual Applications of Differentiation

4.1 Interpreting the Meaning of the Derivative in Context

4.2 Straight-Line Motion: Connecting Position, Velocity,and Acceleration

4.3 Rates of Change in Applied Contexts Other Than Motion

4.4 Introduction to Related Rates

4.5 Solving Related Rates Problems

4.6 Approximating Values of a Function Using Local Linearity and Linearization

4.7 Using L'Hopital's Rule for Determining Limits of Indeterminate Forms

Review - Unit 4

Unit 5 - Analytical Applications of Differentiation

5.1 Using the Mean Value Theorem

5.2 Extreme Value Theorem, Global Versus Local Extrema, and Critical Points

5.3 Determining Intervals on Which a Function is Increasing or Decreasing.

5.4 Using the First Derivative Test to Determine Relative Local Extrema

5.5 Using the Candidates Test to Determine Absolute (Global) Extrema

5.6 Determining Concavity of Functions over Their Domains

5.7 Using the Second Derivative Test to Determine

Mid-Unit Review - Unit 5

5.8 Sketching Graphs of Functions and Their Derivatives

5.9 Connecting a Function, Its First Derivative, and Its Second Derivative

5.10 Introduction to Optimization Problems

5.11 Solving Optimization Problems

5.12 Exploring Behaviors of Implicit Relations

Review - Unit 5

Unit 6 - Integration and Accumulation of Change

6.1 Exploring Accumulation of Change

6.2 Approximating Areas with Riemann Sums

6.3 Riemann Sums, Summation Notation, and Definite Integral Notation

6.4 The Fundamental Theorem of Calculus and Accumulation Functions

6.5 Interpreting the Behavior of Accumulation Functions Involving Area

Mid-Unit Review - Unit 6

6.6 Applying Properties of Definite Integrals

6.7 The Fundamental Theorem of Calculus and Definite Integrals

6.8 Finding Antiderivatives and Indefinite Integrals: Basic Rules and Notation

6.9 Integrating Using Substitution

6.10 Integrating Functions Using Long Division and Completing the Square

6.14 Selecting Techniques for Antidifferentiation

Review - Unit 6

Unit 7 - Differential Equations

7.1 Modeling Situations with Differential Equations

7.2 Verifying Solutions for Differential Equations

7.3 Sketching Slope Fields

7.4 Reasoning Using Slope Fields

7.6 General Solutions Using Separation of Variables

7.7 Particular Solutions using Initial Conditions and Separation of Variables

7.8 Exponential Models with Differential Equations

Review - Unit 7

Unit 8 - Applications of Integration

8.1 Average Value of a Function on an Interval

8.2 Position, Velocity, and Acceleration Using Integrals

8.3 Using Accumulation Functions and Definite Integrals in Applied Contexts

8.4 Area Between Curves (with respect to x)

8.5 Area Between Curves (with respect to y)

8.6 Area Between Curves - More than Two Intersections

Mid-Unit Review - Unit 8

8.7 Cross Sections: Squares and Rectangles

8.8 Cross Sections: Triangles and Semicircles

8.9 Disc Method: Revolving Around the x- or y- Axis

8.10 Disc Method: Revolving Around Other Axes

8.11 Washer Method: Revolving Around the x- or y- Axis

8.12 Washer Method: Revolving Around Other Axes

Review - Unit 8

The Exam

Put your knowledge to the test: The AP Calculus AB Exam assesses your mastery of Calculus AB concepts and techniques. It also gives you the chance to earn college credit while in high school.

About the Exam

The AP Calculus AB Exam is 3 hours and 15 minutes. The 105-minute, 45-question multiple-choice section tests your proficiency on a wide variety of topics. The 90-minute, six-problem free-response section gives you the chance to demonstrate your ability to solve problems using an extended chain of reasoning.

Section 1: Multiple Choice

45 Questions | 1 Hour 45 minutes | 50% of Exam Score

Part A: 30 questions; 60 minutes (calculator not permitted).

Part B: 15 questions; 45 minutes (graphing calculator required).

Questions include algebraic, exponential, logarithmic, trigonometric, and general types of functions.

Questions include analytical, graphical, tabular, and verbal types of representations.

Section 2: Free Response

6 Questions | 1 Hour 30 Minutes | 50% of Exam Score

- Part A: 2 questions; 30 minutes (graphing calculator required).
- Part B: 4 questions; 60 minutes (calculator not permitted).
- Questions include various types of functions and function representations and a roughly equal mix of procedural and conceptual tasks.
- Questions include at least 2 questions that incorporate a real-world context or scenario into the question.

Expanded Math Department SLOs

RHP Math students should read and think critically.

The student should be able to read the text material and examples and be able to extend what they have read to problem solving. They should attack new problems by relating them to previous problems or by researching the text and other materials. Students are often given an assignment to read the text and then answer the *covering the reading problems* without prior instruction. Problems from math contests are woven into courses to encourage creative thinking. Some classes give an SAT *problem of the day*. Also extended response questions are integrated from the Math Diagnostic Testing Project and through Accelerated Math.

RHP Math students should communicate clearly and effectively.

Students must show their work. The steps to solve a problem should be organized so that someone else can follow them. They must be able to frame meaningful questions. They should be able to use appropriate mathematical language. We create a classroom environment where students are encouraged to ask questions and explain their thinking. Occasionally we will give an extended response problem and the student's grade will be based on how well they are able to communicate their reasoning as well as the correctness of the response.

Math students should demonstrate personal, moral and social responsibility.

Students will be required to take notes. They must be able to follow directions. Students should always respect the ideas of others. Students should realize there is always more than one way to solve a problem. We expect students to come to class prepared by bringing necessary materials. As a faculty we also will recognize and reward random acts of kindness. Students may also demonstrate this ESLR by tutoring or mentoring a student in a lower level class.

Math students should value teamwork through participation.

Students should participate in class discussions and be able to ask and answer well-phrased questions. They should be able to work with other students in the class on a project. They should not let down their team, but actually work towards the solution. Projects will be given during the course of the year where students will be required to work with others on a team project. Students will be graded on how well they are able to contribute to the team and cooperate with the team.

Math students should develop skills to be lifelong learners.

Students should be able to take real-life situations and translate them into some type of mathematical model. They should investigate different approaches to the problem and decide on a plan of attack. We look at Star Math results, ACT/SAT scores, Math Diagnostic Test Project results, and Accelerated Math Objectives.