

Haddon Township High School
Course Overview

Subject Area: Math
Course Name: AP Calculus

Summary: This course is offered to students who have completed Pre-calculus or Accelerated Pre-calculus and who desire an introductory course in college calculus. This course prepares students to take the "Calculus AB" AP Exam. Major topics include elementary functions, limits & continuity, derivatives and their applications, and definite and indefinite integrals and their applications.

Unit Title	Student Learning Target	Standards	Resources	Assessment
Unit 1 Limits and Continuity	<i>Students will ...</i> <ul style="list-style-type: none"> Define and find limits as x approaches a given value or infinity Determine if a function is continuous Find rates of change Find the line tangent to a curve	Interpret functions that arise in applications in terms of the context. F-IF.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	Equipment needed: Computer, quizzes, tests, textbooks Teacher Resources: Textbook and textbook resources	Performance Task Test AP Open-Ended Problems
Unit 2 Derivatives	<i>Students will ...</i> <ul style="list-style-type: none"> Define derivative and the rules for finding derivatives Find the relationship between the graph of a function and the graph of a function's derivative and second derivative Determine if a derivative exists Define the Intermediate Value Theorem Understand how derivatives are useful in Economics	Interpret functions that arise in applications in terms of the context. F-IF.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. Analyze functions using different representations. F-IF.7. Graph functions expressed symbolically and show key features of the	Equipment needed: Computer, quizzes, tests, textbooks Teacher Resources: Textbook and textbook resources	Performance Task Test AP Open-Ended Problems

		<p>graph, by hand in simple cases and using technology for more complicated cases.</p> <p>Build a function that models a relationship between two quantities. F-BF.1. Write a function that describes a relationship between two quantities.</p> <p>Model periodic phenomena with trigonometric functions. F-TF.5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.</p>		
<p>Unit 3</p> <p>Applications of Derivatives</p>	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Determine the local or global extreme values of a function • Apply the Mean Value Theorem and find the intervals on which a function is increasing or decreasing • Use the First and Second Derivative Tests to determine the local extreme values of a function and the concavity of a function <p>Solve application problems involving maximum or minimum values</p>	<p>Interpret expressions for functions in terms of the situation they model. F-LE.5. Interpret the parameters in a linear or exponential function in terms of a context</p> <p>Analyze functions using different representations. F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p>	<p>Equipment needed: Computer, quizzes, tests, textbooks</p> <p>Teacher Resources: Textbook and textbook resources</p>	<p>Performance Task Test AP Open-Ended Problems</p>

<p>Unit 4</p> <p>The Definite Integral</p>	<p>Unit Learning Targets <i>Students will ...</i></p> <ul style="list-style-type: none"> • Determine lengths, areas, and volumes using geometry and Riemann sums • Compute definite integrals and indefinite integrals • Apply the Mean Value Theorem for Definite Integrals <p>Apply the Fundamental Theorem of Calculus</p>		<p>Equipment needed: Computer, quizzes, tests, textbooks</p> <p>Teacher Resources: Textbook and textbook resources</p>	<p>Performance Task Test AP Open-Ended Problems</p>
<p>Unit 5</p> <p>Differential Equations and Mathematical Modeling</p>	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Construct antiderivatives using the Fundamental Theorem of Calculus • Compute indefinite and definite integral by the method of substitution • Use integration by parts to evaluate indefinite and definite integrals • Solve problems involving exponential growth and decay in a variety of applications <p>Solve problems involving exponential or logistical population growth</p>	<p>Construct and compare linear, quadratic, and exponential models and solve problems</p> <p>F-LE.1. Distinguish between situations that can be modeled with linear functions and with exponential functions.</p>	<p>Equipment needed: Computer, quizzes, tests, textbooks</p> <p>Teacher Resources: Textbook and textbook resources</p>	<p>Performance Task Test AP Open-Ended Problems</p>
<p>Unit 6</p> <p>Applications of Definite Integrals</p>	<p><i>Students will ...</i></p> <ul style="list-style-type: none"> • Solve problems in which a rate is integrated to find the net change over time in a variety of applications • Use integration to 	<p>Understand and evaluate random processes underlying statistical experiments</p> <p>S-IC.2. Decide if a specified model is consistent with results from a given data-</p>	<p>Equipment needed: Computer, quizzes, tests, textbooks</p> <p>Teacher Resources: Textbook and textbook resources</p>	<p>Performance Task Test AP Open-Ended Problems</p>

	<p>calculate areas of regions in a plane</p> <ul style="list-style-type: none"> • Use integration to calculate volumes of solids and surface areas of solids of revolution • Use integration to calculate lengths of curves in a plane <p>Adapt their knowledge of integral calculus to model problems involving rates of change</p>	<p>generating process, e.g., using simulation.</p> <p>Explain volume formulas and use them to solve problems</p> <p>G-GMD.3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.</p>		
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