

AP Calculus **Nine Weeks: #1** **Worker(s): Maite**
College Board Curriculum Standards for Calculus AB
Textbook: *Elements of Calculus and Analytic Geometry*

I. Functions, Graphs, and Limits	
Indicator	Pages
Limits of functions (including one-sided limits).	
1. An intuitive understanding of the limiting process.	55-77
2. Calculating limits using algebra.	55-77
3. Estimating limits from graphs and tables of data.	55-77
Asymptotic and unbounded behavior.	
4. Understanding asymptotes in terms of graphical behavior.	70-77
5. Describing asymptotic behavior in terms of limits involving infinity.	70-77, 177-185
Continuity as a property of functions.	
7. An intuitive understanding of continuity. (Close values of the domain lead to close values of the range).	77-87
8. Understanding continuity in terms of limits.	77-87
9. Geometric understanding of graphs of continuous functions (Intermediate Value Theorem and Extreme Value Theorem).	83, 84

II. Derivatives	
Indicator	Pages
Concept of the derivative.	
1. Derivative presented geometrically, numerically, and analytically.	42-49
2. Derivative interpreted as an instantaneous rate of change.	42-55
3. Derivative defined as the limit of the difference quotient	42-49
4. Relationship between differentiability and continuity.	42-49
Derivative at a point.	
5. Slope of curve at a point. Examples are emphasized, including points at which there are vertical tangents and points at which there are no tangents.	42-49
6. Tangent line to a curve at a point, local linear approximation, and Newton's Method.	42-49, 117-127, 155-159
7. Instantaneous rate of change as the limit of average rate of change.	49-55
Applications of Derivatives.	
20. Interpretation of derivative as a rate of change in varied applied contexts, including velocity, speed, and acceleration.	49-55
21. Geometric interpretation of differential equations via slope fields and the relationship between slope fields and derivatives of implicitly defined functions.	110-117, 810 Supplementary Handouts
Computation of derivatives.	
23. Knowledge of derivatives of basic functions, including power, exponential, trigonometric, and inverse trigonometric functions.	92-100, 143-150, 159-161
24. Basic rules for the derivative of sums, products, and quotients of functions.	92-110, 143-150
25. Chain Rule and implicit differentiation.	100-117, 127-134, 143-150

AP Calculus **Nine Weeks: #2** **Worker(s): Maite**
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Textbook: *Elements of Calculus and Analytic Geometry*

I. Functions, Graphs, and Limits	
Indicator	Pages
Asymptotic and unbounded behavior.	
5. Describing asymptotic behavior in terms of limits involving infinity	177-185

II. Derivatives	
Indicator	Pages
Derivative at a point.	
8. Approximate rate of change from graphs and tables of values.	49-55, Supplementary Handouts
Derivative as a function.	
9. Corresponding characteristics of the graphs of f and f' .	167-172, 185-203
10. Relationship between the increasing and decreasing behavior of f and the sign of f' .	167-172
11. The Mean Value Theorem and its geometric consequences.	209-216
12. Equations involving derivatives. Verbal descriptions are translated into equations involving derivatives and vice versa.	Supplementary Handouts
Second derivatives.	
13. Corresponding characteristics of graphs of f , f' and f'' .	167-177
14. Relationship between the concavity of f and the sign of f'' .	172-177
15. Points of inflection as places where concavity changes.	172-177
Applications of Derivatives.	
16. Analysis of curves, including the notions of monotonicity (strictly increasing or decreasing) and concavity.	167-177
17. Optimization, both absolute (global) and relative (local) extrema.	185-191, 192-203, Supplementary Handouts
18. Modeling rates of change, including related rate problems.	203-209, Supplementary Handouts
22. L'Hopital's Rule and its use in calculating limits.	216-222

III. Integrals	
Indicator	Pages
Techniques of antidifferentiation.	
11. Antiderivatives following directly from derivatives of basic functions.	237-244, 244-248, 253-260
12. Antiderivatives by substitution of variables, including change of limits for definite integrals.	248-253, 253-260
13. Improper integrals and constants of integration.	237-244, 244-248, 253-260
Applications of antidifferentiation.	
15. Finding specific antiderivatives using initial conditions, including applications to motion along a line.	244-248

III. Integrals	
Indicator	Pages
Interpretations and properties of definite integrals.	
1. Computation of Riemann sums using left, right, and midpoint evaluation points.	260-271, 271-277, Supplementary Handouts
2. Definite integral as a limit of Riemann sums over equal subdivisions.	260-271, 271-277, Supplementary Handouts
3. Definite integral of the rate of change of a quantity over an interval interpreted as the change of the quantity over the interval: $\int_a^b f'(x)dx = f(b) - f(a)$	277-287, Supplementary Handouts
4. Basic properties of definite integrals. Examples include additivity and linearity.	260-271
Applications of integrals.	
5. Area of a region.	260-271, 271-277, 309-313
6. Volume of a solid with known cross-sections, including revolving disc, shell, washer methods, and slicing other regions.	313-319, 320-328
7. Average value of a function.	340-344
8. Net change and distance traveled by a particle along a line.	306-308
Fundamental Theorem of Calculus.	
9. Use of Fundamental Theorem to evaluate definite integrals.	277-287, Supplementary Handouts
10. Use of Fundamental Theorem to represent a particular antiderivative, and the analytical and graphical analysis of functions so defined.	277-287, Supplementary Handouts
Techniques of antidifferentiation.	
12. Antiderivatives by substitution of variables, including change of limits for definite integrals.	287-290
Applications of antidifferentiation.	
17. Use of Riemann and trapezoidal sums to approximate definite integrals of functions represented algebraically, geometrically, and by tables of values.	260-271, 271-277, 290-301, Supplementary Handouts

AP Calculus **Nine Weeks: #4** **Worker(s): Maite**
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I. Functions, Graphs, and Limits	
Indicator	Pages
Asymptotic and unbounded behavior.	
6. Comparing relative magnitudes of functions and their rates of change. (For example, contrasting exponential growth, polynomial growth, and logarithmic growth.)	418-427, Supplementary Handouts

II. Derivatives	
Indicator	Pages
Application of derivatives.	
19. Use of implicit differentiation to find the derivative of an inverse function.	372-378, Supplementary Handouts
Computation of derivatives.	
23. Knowledge of derivatives of basic functions, including power, exponential, trigonometric, and inverse trigonometric functions.	378-384, 385-390, 390-397, 397-403, 403-409, 411-417, 442-449

III. Integrals	
Indicator	Pages
Techniques of antidifferentiation.	
13. Improper Integrals and constants of integration.	491-501
14. Integration by parts.	449-455
Applications of antidifferentiation.	
16. Solving separable differential equations and using them in modeling. In particular, studying the equation $y' = ky$ and exponential growth.	427-435