Topics Covered in Calculus AB

A Functions, Graphs, and Limits

	Pages
1. Analysis of graphs	throughout
2. Limits or functions (including one sides limits) **a.** An intuitive understanding of the limiting process	59–60
b. Calculating limits using algebra	60–63, 65, 443–444
c. Estimating limits from graphs or tables of data	59–60, 63–64, 70–71, 75, 78–82, 141–142, 448–452
3. Asymptotic and unbounded behavior **a.** Understanding asymptotes in terms of graphical behavior	70–75
b. Describing asymptotic behavior in terms of limits involving infinity	70–75
c. Comparing relative magnitudes of functions and their rates of change	73–75, 457–460
4. Continuity as a property of functions **a.** An intuitive understanding of continuity	78
b. Understanding continuity in terms of limits	78–82
c. Geometric understanding of a graphs of continuous functions (Intermediate Value Theorem and Extreme Value Theorem)	78–83, 191–193

B Derivatives

	Pages
1. Concept of the derivative **a.** Derivative presented graphically, numerically, and analytically	99–104, 119–120, 177
b. Derivatives interpreted as an instantaneous rate of change	123, 127–134
c. Derivative defined as the limit of the difference quotient	99–100, 104, 109–110, 116–120, 141–142, 177, 298–299
d. Relationship between differentiability and continuity	109, 113

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2. Derivative at a point	
a. Slope of a curve at a point	87–90, 99, 101–102, 118, 122, 129, 133-134, 145, 155–157, 162–165, 170, 173, 179–180, 202, 418–419
b. Tangent line to a curve at a point and local linear approximation	87–90, 109–110, 118, 122, 129, 133–134, 145, 155–157, 162–165, 170, 174, 179–180, 202, 237–239, 418–419
c. Instantaneous rate of change as the limit of average rate of change	59–60, 87–88, 91, 127–129, 133–134
d. Approximate rate of change from graphs and tables of values	87–88, 103–104
3. Derivative as a function	
a. Corresponding characteristics of graphs of f and f'	101–102, 202–203, 209–211, 214, 216–218
b. Relationship between the increasing and decreasing behavior of f and the sign of f'	202–203, 209–211, 214, 216–218
c. The Mean Value Theorem and its geometric consequences	200–204
d. Equations involving derivatives	127–128, 130–131, 205
4. Second derivatives	
a. Corresponding characteristics of the graphs of f, f', and f''	211–218
b. Relationship between the concavity of f and the sign f''	211–218
c. Points of inflection as places where concavity changes	212–218
5. Applications of derivatives	
a. Analysis of curves, including the notions of monotonicity and concavity	191–197, 202–203, 209–211, 214, 215–218
b. Optimization, both absolute (global) and relative (local) extrema	191–197, 209–211, 214, 215–218, 223–229
c. Modeling rates of change, including related rates problems	242–244, 250–254
d. Use of implicit differentiation to find the derivative of an inverse function	170–172, 179
e. Interpretation of derivative as a rate of change in varied applied contexts, including velocity, speed, and acceleration	127–134, 143–144, 153, 172, 182–183, 202, 205, 213–215, 250–254, 354–360, 366–372
f. Geometric interpretation of differential equations via slope fields and the relationship between slope fields and derivatives of implicitly defined functions	325–330, 346–347, 350, 370–372

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6. Computation of derivatives	
a. Knowledge of derivatives of basic functions, including power, exponential, logarithmic, trigonometric, and inverse trigonometric functions	116–117, 121–122, 141–145, 166–167, 171–174, 177–182
b. Basic rules for the derivative of sums, products, and quotients of functions	117–122
c. Chain rule and implicit differentiation	153–156, 162–167, 179–180, 182

C Integrals

	Pages
1. Interpretations and properties of definite integrals	
a. Computation of Riemann sums using left, right, and midpoint evaluation points	268–273, 310–311
b. Definite integral as a limit of Riemann sums	278–286, 290–291, 394, 403–409, 423–425
c. Definite integral of the rate of change of a quantity over an interval interpreted as the change of the quantity over the interval: $\int_a^b f'(x)\,dx = f(b) - f(a)$	383–389
d. Basic properties of definite integrals	289–290
2. Applications of integrals	282–284, 291–292, 304–305, 354–360, 383–389, 394–398, 403–409, 416–419, 423–428, 469–470
3. Fundamental Theorem of Calculus	
a. Use the Fundamental Theorem to evaluate definite integrals	303–306 (and throughout from here on)
b. Use the Fundamental Theorem to represent a particular antiderivative, and the analytical and graphical analysis of functions so defined	292–294 (exploratory), 298–303, 325–329, 336
4. Techniques of antidifferentiation	
a. Antiderivatives following directly from derivatives of basic functions	204–205, 336–337
b. Antiderivatives by substitution of variables (including change of limits for definite integrals)	336–342

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5. Applications of antidifferentiation	
a. Finding specific antiderivatives using initial conditions, including applications to motion along a line	204–205, 301, 325–330, 383–387
b. Solving separable differential equations and using them in modeling	325, 354–360, 366–372 (exponential growth in precalculus framework 22–25)
6. Numerical approximations to definite integrals	267–273, 285 (numerical integration using calculator occurs throughout from here on), 310–315

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