

Calculus AB

Limits and Continuity Reporting Standard

PS 1- Prove and use theorems evaluating the limits of sums, products, quotients, and composition of functions.

PS 2- Find, describe, and compare limits and asymptotic/unbounded behavior of functions analytically, graphically, numerically, and verbally including one-sided limits.

PS 3- Define continuity in terms of limits.

PS 4- Demonstrate knowledge of the formal definition and graphical interpretation of continuity of a function.

PS 5- Demonstrate an understanding and the application of the intermediate value theorem and the extreme value theorem.

PS 6- Determine whether a series converges or diverges.

PS 7- Determine or estimate the sum of an infinite series.

Differentiation: Definitions and Fundamental Properties Reporting Standard

PS 8- Demonstrate an understanding of the derivative of a function as the slope of the tangent line to the graph of the function.

PS 9- Demonstrate an understanding of the interpretation of the derivative as an instantaneous rate of change.

PS 10- Explain the relation between differentiability and continuity.

PS 11- Derive derivative formulas and use them to find the derivatives of polynomial, trigonometric, exponential, and logarithmic functions.

Differentiation: Composite, Implicit, and Inverse Reporting Standard

PS 12- Use the chain rule in the calculation of the derivative of a variety of composite functions.

PS 13- Use implicit differentiation to find the derivatives of parametrically defined functions

PS 14- Derive derivative formulas and use them to find the derivatives of inverse trigonometric and other inverse functions.

PS 15- Compute derivatives of higher order.

PS 16- Apply Rolle's theorem, the mean value theorem, and L'Hopital's rule.

PS 17- Derive derivative formulas that can be extended to find the derivatives of vector-valued functions, parametric functions, and functions in polar coordinates.

PS 18- Use differentiation to verify that a function is a solution to a differential equation using slope fields or Euler's method of approximating a solution curve.

Application of Differentiation Reporting Standard

PS 19- Use derivatives to solve a variety of problems that involve the rate of change of a function.

PS 20-Use differentiation to sketch, by hand, graphs of functions. Be able to identify maxima, minima, inflection points, and intervals in which the function is increasing and decreasing.

PS 21-Use differentiation to solve optimization (maximum-minimum problems) in a variety of pure and applied contexts.

PS 22-Use differentiation to solve related rate problems in a variety of pure and applied contexts.

Integration and Accumulation of Change Reporting Standard

PS 23-Use the definition of the definite integral by using Riemann sums to approximate integrals.

PS 24-Demonstrate knowledge and proof of the fundamental theorem of calculus and use it to interpret integrals as antiderivatives.

PS 25-Compute the integrals of a wide variety of functions by using techniques of integration, such as substitution, integration by parts, and trigonometric substitution.

PS 26-Apply the properties of inverse trigonometric functions and the expression of these functions as indefinite integrals.

Application of Integration Reporting Standard

PS 27-Apply the definition of the integral to model problems and obtain results in terms of integrals.

PS 28-Use definite integrals in problems involving area, velocity, and acceleration.

PS 29-Use definite integrals in problems involving volume of a solid, area of a surface of revolution, length of a curve, and work.

PS 30-Apply the underlying concept involved in integration to solve separable differential equations or logistic equations and define the relationship between a function or relation and its rate of change.
