Calculus BC

GRADE

Limits and Continuity Reporting Standard

BC.1-Solve and describe functions including linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric, and piecewise analytically, graphically, numerically, and verbally.

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

BC.3-Define continuity in terms of limits and graphs (including Intermediate Value Theorem and Extreme Value Theorem).

Differentiation Reporting Standard

BC.4-Compute and determine the derivative of functions and relations using power rule, product rule, quotient rule, chain rule, and implicit differentiation, and logarithmic differentiation of functions including power, exponential, logarithmic, trigonometric, and their inverses analytically, graphically, numerically, and verbally and as a rate of change and difference quotient.

BC.5-At a point, find the slope of a curve, the instantaneous rate of change, and average rate of change of the function analytically, graphically, numerically, and verbally. Write the equation of the tangent line and the equation of the normal line.

BC.6-Distinguish between characteristics of f, f', and f'' and the relationship between increasing and decreasing behavior and concavity analytically, graphically, numerically, and verbally.

Differentiation Application & Differential Equations Reporting Standard

BC.7-Solve problems using the derivative analytically, graphically, numerically, and verbally for a variety of problems (including optimization, related rates, rectilinear motion).

BC.8-Solve problems including those that model physical (including acceleration, velocity, and position), biological, or economic situations and average value.

BC.9-Solve problems including those that model area, volume, and surface area.

BC.10-Model situations with differential equations and verify solutions for differential equations.

BC.11-Sketch and reason using Slope Fields.

BC.12-Approximate solutions to a differential equation or a point on a solution curve using Euler's Method

BC.13-Calculate and interpret exponential models and logistic models in context with differential equations.

Integration Reporting Standard

BC.14-Interpret and apply the relationship between derivative and definite integral as expressed in both parts of the Fundamental Theorem of Calculus.

BC.15-Compute antiderivatives and Indefinite integrals of functions and relations using derivatives of basic functions and substitution.

BC.16-Find specific antiderivatives by applying properties of definite integrals using initial conditions, and use them in modeling.

BC.17-Approximate and interpret definite integrals of functions represented analytically, graphically, and numerically using Riemann sums (using left, right, and midpoint evaluation points) and trapezoidal sums.

BC.18-Determine and evaluate definite integrals Using Integration by Parts.

BC.19- Determine, evaluate, and interpret specific integration using linear partial functions.

BC.20-Evaluate an improper integrals and determine that the integral diverges.

Applications of Integration Reporting Standard

BC.21-Calculating, interpreting, and connecting position, velocity, and acceleration of functions using integrals.

BC.22-Calculating area between curves.

BC.23-Calculate the volume with cross sections, Disc Method, and Washer Method.

BC.24- Calculate the length of a curve in the plane defined by a function and distance traveled, using a definite integral.

Sequences and Series Reporting Standard

BC.25-Using tests of convergence, determine the convergence/divergence of a series or sequence and the limit of its sum.

BC.26-Develop, manipulate, and approximate polynomial approximations of transcendental functions and determine error bounds and convergence.

BC.27-Finding Taylor polynomial approximations of functions.

BC.28-Finding Taylor or Maclaurin series for a function.

BC.29-Representing Functions a Power series.

BC.30-Defining,and calculating derivatives of parametric equations.

BC.31-Defining, differentiating, and integrating vector valued functions.

BC.32-Determine values and solve motion problems using parametric and vector valued functions.

BC.33-Defining and calculate derivates of functions written in polar coordinates.

BC.34-Calculate areas of polar regions or area bounded by polar regions