**AP Calculus BC Review Guide**

Assignment:  
Create a 1-2 pages (front and back), handwritten, cumulative guide.

Scoring Rubric:  
5 points: Your Name  
20: Appearance (neatness, organized, legible)  
75 points: Contains required content below

Unit Circle  
-include radians, degrees, coordinate points

Limits & Continuity  
-Definition of a Limit   
-How to find a Horizontal and Vertical Asymptote  
-Definition of Continuity  
-L’Hospital’s Rule  
-Intermediate Value Theorem (include example)

Derivatives  
-Limit definition of a derivatives  
-Derivative rules: constant, constant multiple, power, product, quotient, chain, trig, inverse trig, exponential (ex and 23x), natural log, implicit differentiation  
-How to make a tangent line (include example)  
-Mean Value Theorem (include example)

Applications of Derivatives: Characteristics of Functions  
-Critical points  
-Interval of increase, decrease  
-Absolute/global vs. relative/local extrema  
-Inflection points  
-Interval of concave up, down  
-Extreme Value Theorem  
-First Derivative Test  
-Second Derivative Test

More Applications of Derivatives  
-Optimization  
-Related Rates

Integrals  
-Riemann Sums: rRam, lRam, mRam, trapezoid  
-indefinite vs. definite integral  
-Fundamental Theorem of Calculus (parts 1 & 2)  
-Antiderivative rules: constant, power, trig, inverse trig, exponential (ex), natural log  
- Average Value  
-Arclength of a function

Motion  
-Relationship between position, velocity, acceleration  
-When a particle is at rest, moving in a positive/negative direction… in terms of velocity  
-When a particle is speeding up or slowing down  
-Distance vs. displacement integral

Area and Volume  
-Area between a curve and the x-axis  
-Area between 2 curves  
-Rotational volume: disk vs. washer method  
-Cross-sectional volume

Differential Equations  
-Definition  
-Steps to solve a diff eq  
-Particular vs. general solutions to a diff eq  
-Slope fields  
-Euler’s Method

Continued on back 🡪

Techniques of Integration  
-U-substitution (include example of indefinite and definite integral)  
-Integration by parts  
-Partial Fraction (include example)  
-Long/Synthetic Division (include example)  
-Improper Integrals: converging vs. diverging

Polar   
-Definition  
-Connecting Polar to Cartesian & Cartesian to Polar  
-1st and 2nd derivative of a Polar curve  
-Polar Area

Parametric  
-Definition  
-1st and 2nd derivative of a Parametric equation  
-Parametric Arclength  
-Speed  
-Vectors

Sequences  
-Definition  
-Converging vs. Diverging sequences

Series  
-Definition   
-Converging vs. Diverging series  
-Convergence tests: Test for Divergence, Geometric (include sum formula), p-series, comparison, limit comparison, alternating series, absolute vs. conditional convergence, ratio test, alternating series estimation theorem \*\*you can attach sheet we already made in class for these tests\*\*

Power Series  
-Definition  
-Radius & Interval of Convergence  
-Power series and first four terms for functions: y=1/(1-x), e^x, sinx, cosx, arctan(x), ln(1+x)  
\*\*all found on p.784 of textbook\*\*  
-Taylor Series and first 4 terms  
-MacLaurin Series and first 4 terms