AP Calculus AB Scope and Sequence (Roger A. Winter)

1. Limits
2. Introduction to limits and notation (Using tables)
3. Limits graphically (1 & 2-sided limits)
4. Limits algebraically
5. Limits @  (Horizontal Asymptotes)
6. Continuity
7.  exists
8.  exists
9. 
10. Differentiation
11. Intro to Differentiation
12. Definition of derivative (average vs. instantaneous rate of change secant and tangent lines. Finding tangent line slopes with difference quotient and secant slopes using .
13. Power Rule 
14. Equations of tangent and normal lines
15. Tangent line approximations of functions
16. Differentiation and derivative graphs
17. Differentiability Continuity
18. Characteristics of  graphs
19. Not differentiable at corner points and vertical lines of tangency
20. Mix & Match Activity with  graphs
21. Emphasis on  representing y-values of function and  representing slopes of tangent lines.
22. Differentiation Techniques
23. Product and Quotient Rules  and 
24. Derivatives of trig functions



1. Chain Rule  or 
2. Derivative rules with graphs and tables
3. Derivatives of Transcendental Functions (Ln & e)



1. L’Hopital’s Rule: If  is indeterminate , then 
2. Derivatives of inverse functions

* If f and g are inverse functions, then 

1. Derivatives in disguise:  means to derive , which is 
2. Derivatives of inverse trig functions



1. Implicit Differentiation
2. Applications of derivatives
3. Related Rates
4. Function Analysis ()
5. Existence Theorems (IVT, EVT, MVT, Rolle’s Theorem)
6. Optimization
7. PVA (Position, Velocity, & Acceleration) – differentiation only
8. Integration
9. Indefinite integrals (anti-differentiation)
10. Riemann Sums (Left, Right, Midpoint, & Trapezoidal) and over/under approximations, as well as limit/summation definition of Riemann Sums
11. FTC (Fundamental Theorem of Calculus I and II) & Average Value
12. PVA (with integration)
13. U-Substitution
14. Separable Differential Equations & Slopefields

(separate, integrate, + C, use initial condition, solve)

1. Areas & Volumes (disks, washers, and known cross-sections)

BC Concepts

1. Advanced Integration Techniques
2. Partial Fractions
3. Parts
4. Mixed Integration (Long/Synthetic Division, “Almost”)
5. Improper Integrals
6. Logistic Growth Equations
7. Parametric, Polar, Vectors, and Misc Cal
8. Length of Curve
9. Euler’s Method
10. Parametric Equations
11. Vector-Valued Functions
12. Polar Graphs & Equations
13. Polar Area
14. Series
15. Sequences
16. Series Convergence, Geometric Series, nth term test
17. Power Series
18. Taylor Series
19. Elementary Series , Alternating Series
20. Error Approximations (Alternating Series, Lagrange Error Bound)
21. Integral Test, p-series
22. Comparison Tests
23. Ratio Test
24. Interval of Convergence
25. Absolute vs. Conditional Convergence