Day 1 – Limits, Continuity, and Differentiation Review

✓ When does a limit exist?
✓ Computing limits
✓ When is a function continuous?
✓ What is a derivative?
✓ When is a function differentiable?
✓ What is the relationship between continuity and differentiability?
✓ Differentiation formulas
✓ The Chain Rule
✓ Implicit differentiation
✓ Related rates problems

Day 2 – Curve Sketching and Optimization

✓ Increasing and decreasing intervals, 1st derivative test
✓ Local extrema, critical points
✓ Optimization problems
✓ Higher-order derivatives
✓ Concavity and points of inflection, 2nd derivative test

Day 3 – Integration review

✓ Basic integration rules
✓ U-substitution
✓ Area between curves
✓ Volume of revolved solids

Current topics:

✓ Integration by parts
✓ Trigonometric Integrals
1 Functions and Models
   1.5 Exponential Functions
   1.6 Inverse Functions and Logarithms

2 Limits and Derivatives
   2.1 The Tangent and Velocity Problems
   2.2 The Limit of a Function
   2.3 Calculating Limits Using the Limit Laws
   2.4 The Precise Definition of a Limit
   2.5 Continuity
   2.6 Limits at Infinity; Horizontal Asymptotes
   2.7 Derivatives and Rates of Change
   2.8 The Derivative of a Function

3 Differentiation Rules
   3.1 Derivatives of Polynomials and Exponential Functions
   3.2 The Product and Quotient Rules
   3.3 Derivatives of Trigonometric Functions
   3.4 The Chain Rule
   3.5 Implicit Differentiation
   3.6 Derivatives of Logarithmic Functions
   3.7 Rates of Change in the Natural and Social Sciences (optional)
   3.8 Exponential Growth and Decay
   3.9 Related Rates
   3.10 Linear Approximations and Differentials
   3.11 Hyperbolic Functions (quickly)

4 Applications of Differentiation
   4.1 Maximum and Minimum Values
   4.2 The Mean Value Theorem
   4.3 How Derivatives Affect the Shape of a Graph
   4.4 Indeterminate Forms and L'Hopital's Rule
   4.5 Summary of Curve Sketching
   4.7 Optimization Problems
   4.9 Antiderivatives

5 Integrals
   5.1 Areas and Distances
   5.2 The Definite Integral
   5.3 The Fundamental Theorem of Calculus
   5.4 Indefinite Integrals and the Net Change Theorem
   5.5 The Substitution Rule

6 Applications of Integration
   6.1 Areas between Curves
   6.2 Volume
   6.3 Volumes by Cylindrical Shells (optional)
   6.4 Work (optional)
   6.5 Average value of function (optional)