

## Topics for Kossack Prize Exam

Rates of Change and Tangents to Curves  
Limit of a Function and Limit Laws  
One-Sided Limits  
Continuity  
Limits Involving Infinity; Asymptotes of Graphs  
Tangents and the Derivative at a Point  
The Derivative as a Function  
Differentiation Rules  
The Derivative as a Rate of Change  
Derivatives of Trigonometric Functions  
The Chain Rule  
Implicit Differentiation  
Derivatives of Inverse Functions and Logarithms  
Inverse Trigonometric Functions  
Related Rates  
Linearization and Differentials  
Extreme Values of Functions  
The Mean Value Theorem  
Monotonic Functions and the First Derivative Test  
Concavity and Curve Sketching  
Indeterminate Forms and L'Hôpital's Rule  
Applied Optimization  
Newton's Method  
Antiderivatives  
Area and Estimating with Finite Sums, Sigma Notation and Limits of Finite Sums  
The Definite Integral  
The Fundamental Theorem of Calculus  
Indefinite Integrals and the Substitution Method  
Substitution and Area Between Curves  
Volumes Using Cross-Sections  
Volumes Using Cylindrical Shells  
Arclength and Areas of Surfaces of Revolution  
Work  
Exponential Change and Separable Differential Equations  
Integration by Parts  
Trigonometric Integrals  
Trigonometric Substitutions  
Integration of Rational Functions by Partial Fractions  
Numerical Integration  
Improper Integrals