

Exam IV Review Topics

I.	Optimization	
A.	Optimization Procedure (page 238)	4.6:4,7,16,21
II.	Anti-differentiation and Indefinite Integral	
A.	Definition	
B.	Notation/Terminology	
C.	Constant of Integration	
D.	Basic Rules (Table page 275)	5.1:6,21,22,25,28
E.	Basic Formulas (Table page 275)	5.1:7,12,13,16,19
F.	Area	
III.	Summation	
A.	Basic Rules for Summation (Table page 286)	
B.	Basic Summation Formulas (Table page 287)	
IV.	Riemann Sums and Definite Integral	
A.	Procedure for constructing a Riemann sum (page 291)	5.3:2,3
B.	Definition of Integral as Limiting Process of Riemann Sums (page 293)	
C.	Theorem (Advanced Calculus) Existence of Integral (page 294)	
D.	Area as an Integral (Chart page 295)	
E.	Properties of Definite Integral	5.3:18,19,25,26
1.	Linearity, Dominance, Subdivision	
F.	Total Area vs Net Area	
V.	Fundamental Theorems of Calculus	
A.	First Fundamental Theorem of Calculus (page 303)	
B.	Evaluating Definite Integrals	5.4:6,15,18,20,22,26,32,35
1.	Notation	
C.	Second Fundamental Theorem of Calculus (page 306)	5.4:39,42
1.	Chain Rule Extension	
VI.	Integration by Substitution	5.5:9,12,17,23,24,31,33
A.	Evaluation of Definite Integrals	5.5:35,38,40
VII.	First Order Differential Equations	
A.	Definition	
B.	Notation/Terminology	
1.	Solution, General Solution, Particular Solution	5.6:21,23,25
2.	Initial Value Problem (IVP)	5.6:9,12,14
C.	First Order Separable Equations	
1.	Technique for Solving	

D.	Modeling Problems	
1.	Growth/Decay	5.6:51,62
2.	Orthogonal Trajectories	5.6:39
VIII.	Mean Value Theorem for Integrals	5.7:3,9
A.	Average Value of a Function	5.7:34
IX.	Numerical Integration	
A.	Efficient Rules	5.8:3,7
1.	Mid-Point Rule	
2.	Trapezoid Rule	
3.	Simpson's Rule	
B.	Error Estimates	5.8:19,20
1.	Mid-Point Rule	
2.	Trapezoid Rule	
3.	Simpson's Rule	
X.	Natural Logarithm: Definition via an Integral	