Final Exam Review

This is a brief summary of concepts and type of questions that are important for your preparation of the final exam. Read the corresponding parts in textbook and lecture notes for detail.

1 Advanced Topics in Single-Variable Differentiation

1. Linear Approximation
2. Differential
3. Quadratic Approximation
4. L'Hospital's Rule
5. Elasticity

2 Optimization of Single-Variable Functions

1. Definition of Extreme (Maximum, Minimum) Points, Extreme (Maximum, Minimum) Values, Critical Points
2. Find Maximum Points and Minimum Points by discussing the signs of derivative
3. Find Maximum Points and Minimum Points by discussing derivative and second order derivative
4. Find Maximum and Minimum of a function on a closed interval by looking for candidates

5. Prove Inequalities using Optimization
6. Definition of Local Extreme (Maximum, Minimum) Points
7. Find Local Maximum Points and Local Minimum Points by discussing the signs of derivative
8. Find Local Maximum Points and Local Minimum Points by discussing derivative and Second Order Derivative
9. Optimization in Applications

3 Multi-Variable Function Differentiation

1. Domain of Two-Variable Functions, Draw it in the xy-plane
2. Partial Derivatives
3. Second Order Partial Derivatives
4. Chain Rule for Multi-Variable Diffeentiation
5. Applications

4 Advanced Topics in Multi-Variable Differentiation

1. Partial Elasticity
2. n-Variable Differentiation
3. Young's Theorem
4. Graph of 2-Variable Functions
5. Level Sets (Level Curves), Draw it in the xy-plane
6. Implicit Differentiation Along A Level Curve
7. Implicit Differentiation with 1 more Variable

8. Marginal Rate of Substitution
9. Elasticity of Substitution
10. Linear Approximation
11. Differential
12. Applications

5 Optimization of Two Variables

1. Find Extreme (Maximum, Minimum) Points and Extreme (Maximum, Minimum) Values
2. Find Local Maximums points, Local Minimum Points and Saddle Points
3. Applications