

## **THINGS TO KNOW FOR EXAM #1**

### **Chapter 1: Functions, Graphs and Limits**

- Definition and use of functions and their graphs.
- Definition of Demand Function, Total Revenue Function, Total Cost Function and Cost Function.
- Definition and use of Composition of Functions.
- Linear Functions (straight lines).
- Law of Supply and Demand.
- Break Even Analysis.
- Non-rigorous Definition of Limits (including one-sided Limits). Know how to calculate Limits.
- Horizontal Asymptotes.
- Definition of Continuity and how to identify it.
- Intermediate Value Theorem.

### **Chapter 2: Differentiation: Basic Concepts**

- Definition of a Derivative and how to find a Derivative from the Definition.
- Differentiable implies Continuous.
- Relationship between position, velocity and acceleration.
- Definition of tangent lines.
- Differentiation Rules for Powers, Constant Multiples and Sums.
- Product and Quotient Rules of Differentiation.
- Chain Rule.
- Differentials and Marginal Analysis (Marginal Cost, Revenue and Profit).
- Relative and Percentage Rate of Change.

- Implicit Differentiation.
- Related Rates Problems.

### **Chapter 3: Additional Applications of the Derivative**

- Know the relationship between First Derivative and increasing/decreasing.
- Definition of Extrema and how to find Extrema of a continuous function on a closed interval.
- First Derivative Test.
- Know the relationship between Second derivative and Concavity.
- Inflection Points.
- Second Derivative Test.
- Vertical Asymptotes.
- Sketching Curves (when increasing/decreasing and when concave up/down).
- Criterion for Maximum Profit and Criterion of Minimal Average Cost.
- Price Elasticity of Demand.
- Optimization Problems.

### **ADVICE**

- Review homework problems and feel free to visit me during office hours.