

Key Concepts

December 5, 2022

This list is provided to guide your studying. It is not absolutely exhaustive, but I have tried to include everything I think is key. Please let me know if there is a concept that I have covered in class that does not appear here. Either I will include it or tell you that it is not an important concept to study for the exam. Where appropriate, you should be able to solve problems analytically and demonstrate the concepts graphically.

- Construct the budget line/set.
- Understand and demonstrate how changes in prices and income affect the budget line (set).
- Construct the budget and understand how it changes under more advanced scenarios such as taxes, quantity discounts, etc.
- Understand what a preference relation is and how to use it to represent preferences.
- Understand the properties that preferences can have such as reflexivity, completeness, monotonicity, transitivity, and convexity.
- Know what properties are needed to construct a utility function and how a utility function can be used to *represent* preferences.
- Understand what indifference curves represent and how they can be used to “graph” consumer preferences.
- Construct indifference curves from a utility function or description of preferences. Understand how the properties of a preference relation translate into different shapes of indifference curves.
- Know the classical utility functions: perfect compliments, perfect substitutes, quasi-linear and Cobb-douglass and what kind of preferences they represent.
- Understand the concepts of marginal utility and marginal rates of substitution [MRS] as well as how to find these from a utility function and what they mean.

- Be able to solve choice problems by maximizing utility to find demand under a variety of scenarios.
- Understand both the mathematics and the intuition for why and when the MRS being equal to the ratio of prices is necessary for a utility maximizing bundle except in the case of a “boundary” solution (like in perfect substitutes) or non-smooth preferences where the MRS does not exist (like in perfect complements).
- Draw income offer curves, Engel curves, price offer curves, demand and inverse demand graphs.
- Understand properties of demand such as whether goods are normal, inferior, ordinary, Giffen, compliments, substitutes, etc.
- Be able to find and use inverse demand functions, know what they mean and why they are useful.
- Understand Slutsky decomposition and know how to decompose changes in demand into substitution and income effects (do this graphically as well).
- Understand how to solve choice problems, find demand and its properties when income is not in terms of money, but endowments of goods.
- Understand the situations when we can say that a consumer remains a net-buyer/seller of a good under certain price changes and is better off than before the price change.
- Solve intertemporal choice problems (consumption today, consumption tomorrow). Be able to work with (and graph) the budget equation and transform between present and future value.
- Understand the situations when we can say that a consumer remains a borrower/lender under interest rate changes and is better off than before the interest rate change.
- Add up individual demand functions to find “market” demand functions.
- Calculate income and price elasticities for individuals and the market. Understand their meaning.
- Demonstrate equilibrium problems graphically and show how taxes affect equilibrium price and quantity.
- Solve equilibrium problems analytically and assess the same effects.
- Calculate consumer surplus, producer surplus, and dead-weight-loss from a tax.

- Find and understand the properties of production functions such as marginal product, returns to scale, rate of technical substitution.
- Be able to determine when production functions have certain properties such as decreasing marginal product, and various returns to scale.
- Understand the concepts of short and long-run production.
- Work with production functions to solve problems both in long and short-run.
- Solve producer problems by using both profit-maximization and cost minimization both in long and short run.
- Find conditional factor demands and cost functions using cost minimization.
- Understand how returns to scale affects cost functions.
- Solve for the optimal price and quantity of a monopolist under various demand functions.
- Find the markup of a monopolist using elasticity of demand. Understand why elasticity of demand determines the monopolist markup.
- Understand why the monopolist can always increase profit when demand is inelastic.
- Find the Dead-Weight-Loss under monopoly pricing. Understand the meaning of this concept.
- Understand other ways monopolists can exercise market power including the three forms of price discrimination, bundling, and two-part tariffs.
- Solve for the optimal prices for two groups under third-degree price discrimination. Calculate how much extra profit the monopolist can earn by using third-degree price discrimination.
- Solve for the optimal prices to set using bundling- where the monopolist charges one price for a bundle of two different goods.
- Solve for the optimal entry fee and unit price in a two-part tariff problem.
- Solve Cournot oligopoly problems (see class notes).
- Find collusive quantity and profits for firms in Cournot Oligopoly.
- Solve simple supply externality problems to find the individually-optimal production levels and the efficient output levels using joint profit maximization.

- Solve “tragedy of the commons” problems to find the amount of use under individually-optimal use or entry and the efficient amount of use or entry. Find the fee or tax that brings use to the efficient level.
- Solve public goods problems to find both the individually-optimal contributions and efficient contributions.