

Econ 3101 Intermediate Microeconomics
Spring 2010, Section 003
Final Practice

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1 Define the following terms:

- Optimization principle
- Equilibrium principle
- Opportunity cost
- Monotonic preferences
- Convex preferences
- Normal good
- Inferior good
- Ordinary good
- Giffen good
- Endogenous variable
- Exogenous variable
- Rationing
- Quantity tax
- Ad-valorem tax
- Inelastic demand
- Elastic demand

- Common-value auction
- Private-value auction
- English auction
- Dutch auction
- First-price sealed-bid auction
- Second-price sealed-bid auction
- Monopoly
- Oligopoly
- Price discrimination
- Marginal cost
- Increasing returns to scale
- Constant returns to scale
- Decreasing returns to scale
- Cournot-Nash competition
- Bertrand competition
- Stackelberg competition
- First Welfare Theorem
- Second Welfare Theorem
- Pareto efficiency
- Nash equilibrium
- Dominant strategy equilibrium
- Asymmetric information
- Adverse selection
- Moral hazard

2 Extra Problems

Question 1. *Game Theory.*

Boy meets girl, asks her out and succeeds, but fails to coordinate their date. They have no way of communicating with each other, but can each either go to an action movie or an art flick. If they manage to meet up, he prefers the action movie (payoff: 4) twice as much as the art flick (2), while she prefers the art flick (4) twice as much as the action movie (2). Both get zero (0) payoff if they end up going to different movies, so they are strictly better off if they meet (regardless of the movie) than if they don't.

- (a) Construct the payoff matrix for this game. (He is the row player.)
- (b) Find all pure-strategy Nash equilibrium (equilibria).
- (c) Find all purely-mixed Nash equilibrium (equilibria).

Question 2. *Profit Maximization.*

Imagine a world where you are in charge of developing and selling Apple's new iPhone. This product will sell for price p , and requires both labor L and capital K to manufacture.

- (a) If the technology you're given is the Cobb-Douglas production function, $y = f(L, K) = L^a K^b$ and labor costs w while capital costs r , what is your profit maximizing output y , and how many units of labor L and capital K will you hire? Express your answers as functions of the parameters p , a , b , r , w .
- (b) Suppose now your production function is linear, and takes the form $y = f(L, K) = 3L + 4K$. Assume that both labor and capital cost w . What must price p be to induce you to start producing output? How much output will you produce price goes above this minimum level?

Question 3. *Asymmetric Information.*

Indiana Jones is in the business of producing hay. He employs his only son, Junior. If Junior works x hours he produces x bales of hay. Each bale of hay sells for 10 dollars. The cost to Junior of working x hours is $c(x) = x^2/10$.

- (a) What is the efficient number of bales of hay for Junior to cut?
- (b) If Junior has no outside option, i.e. he can't make anything outside of the job his dad offers, how much will Indiana Jones pay him to get him to work the efficient amount?

(c) How much profit will Indiana Jones make if part (b) is true?

(d) Suppose Junior now has another job offer that takes no effort but would give him 100 dollars. How much would Indiana Jones have to pay him to get him to produce the efficient amount in this case?

Question 4. Auctions.

A kryptonite rock is up for auction and there are two bidders, Kent and Luthor. The seller decides he will accept sealed bids from each bidder and will sell the object to the highest bidder at the highest bidder's bid. Each bidder believes the other is equally likely value the kryptonite at any amount between 0 and 1000. The rock is actually worth 800 to Luthor. If he gets it, his profit will be the difference between 800 and the price he pays for it. If he doesn't, his profit is zero. He wants to make his bid so maximizes his expected profit.

(a) Suppose Luthor thinks Kent will bid exactly what the Kryptonite is worth to him. If Luthor bids 700 for it, what is the probability that he gets it? If he gets the rock for 700, what is his profit? What is his expected profit, then, if he bids 700?

(b) Similar to part (a) what is the probability that Luthor gets the rock if he bids 600 for it? What is his expected profit in this case?

(c) Generalizing from part (a) and part (b), if Luthor bids x for it, with what probability will he get it? What will be his expected profit?