Econ 51 Stanford University
Summer 98/99 Gerald Willmann

# Final

Below are eight questions. There were seven quizzes. You are responsible for ten out of these fifteen. Please, in three hours, answer as many questions as you need in order to bring your total up to ten. Please indicate on the blue book(s) which questions you have chosen to answer. Good luck!

1. Consider a price-taking consumer whose preferences can be represented by $U(x_1, x_2) = x_1 x_2$ and who faces a budget constraint of the form $I = p_1 x_1 + p_2 x_2$.

   a) Find the Marshallian demand functions as well as the indirect utility function.

   b) Find the Hicksian demand functions as well as the expenditure function.

2. You have just been placed in charge of ASSU's anti-monopoly task force. You have been assured by the university that competition for the right to provide duplication services at the university is very competitive. But you have discovered that the on-campus duplication service charges ten cents per page. Off campus, where duplication services face heavy competition, the price is only three cents per page.

   a) How could such a price differential exist?

   b) To prove your point that students are getting ripped off, you have analyzed the on-campus duplication service's marginal cost and the elasticity of student demand. How would you use this information to make your case?

   c) Who gains and who loses from the higher on campus price - show graphically. Who do you suspect will end up with the monopoly rent?

3. The standard own price Slutsky equation is $\delta x_i / \delta p_i = \delta x_i^C / \delta p_i - x_i \, \delta x_i / \delta I$.

   a) Sign each term in this equation for a normal, a Giffen, and an inferior good which is not Giffen.

   b) What changes if the consumer is a net supplier of $x_i$?

   c) Derive the above equation (hint: start with the relation between Marshallian and Hicksian demand and use Shephard's lemma.)

4. A company has two plants A and B at which it produces the same product. The cost functions for each plant are $C_A(Y_A) = Y_A^2$ and $C_B(Y_B) = 2Y_B^2$ respectively.

   a) Assume the company is small and takes the output price as given. Find its profit maximizing output supply function.

   b) Now, suppose that the company is a monopolist facing the demand function $Y^D = 100 - P$. Again find the profit maximum.

5. Pat and Eric have registered for Stanford's new high sea adventure class and are on their way to Hawaii onboard a 24 foot sailboat. Stanford provided each of them with 10 gallons of water and 10 gallons of Coke™ (to stay awake). Pat can't stand Coke and only cares for water. Eric on the other hand regards both as perfect substitutes.

   a) Draw the appropriate Edgeworth box and depict a few of their respective indifference curves, the endowment point, the area of mutually beneficial trades, and the contract curve.

   b) Given the above endowments, find all possible market equilibria and the corresponding equilibrium prices.

   c) State Walras' law and show it for the above economy.

6. Consider a profit maximizing company that produces a single output and takes the output price as given. Its production technology exhibits increasing returns at low output levels and decreasing returns at higher quantities.

   a) Depict this company's cost function C(Y) and also its marginal and average cost. Please indicate clearly where the marginal cost increases and where it decreases.

   b) Describe the profit maximizing output supply graphically and also derive the analytical optimality condition for a profit maximum.

   c) Discuss in detail how i) a lump sum tax, ii) a proportional tax on profits, and iii) a tax on each unit of output affects the profit maximizing output supply.

7. Susie's and Donald's demand for commodity x is of the form $D^j(p, I_j) = \alpha_j I_j / p$ where $j \in$ {Susie, Donald}, i.e. Susie and Donald (might) have different income and different expenditure shares.

   a) Find the aggregate demand curve. Show under which condition it is a funtion of aggregate income ($I_{Susie} + I_{Donald}$) instead of both income levels separately.

   b) Suppose that on the supply side we have a fixed quantity of x denoted by S. Find the equilibrium price and quantity.

   c) Now the government introduces a tax to be paid by consumers, that is by Susie and Donald. Explain and show graphically the difference between a quantity and an ad valorem tax. Who will bear the burden of taxation? Is there a dead-weight loss?

8. On different occasions you see Jimmy consume bundle A ($x_1$=7, $x_2$=4) when the price is ($p_1$=3, $p_2$=3), bundle B ($x_1$=6, $x_2$=6) when the price is ($p_1$=4, $p_2$=2), and bundle C ($x_1$=7, $x_2$=3) when the price is ($p_1$=5, $p_2$=1).

   a) What do you conclude about his preferences regarding A and C from the 1st and 3rd observation?

   b) What do you conclude about his preferences regarding A and B from the 1st and 2nd observation?

   c) What do you conclude about his preferences regarding B and C from the 2nd and 3rd observation?