University of Georgia

Department of Agricultural and Applied Economics

Microeconomics Qualifier **May 2009**

Your 810 Code # _____

Please provide complete answers to all five questions. Number you answers clearly to correspond to each question

1. Suppose a firm faces a production function $f(x_1, x_2) = x_1^{1/3} x_2^{1/3}$.

a. Derive the firm's conditional factor demands, $x_1^c(w_1, w_2, y), and\ x_2^c(w_1, w_2, y)$, and the cost function $c(w_1, w_2, y)$, where w_1 and w_2 are input prices and y is output.

b. Assume that the firm is a price-taker and derive the firm's supply function $y(w_1, w_2, p)$ where p is output price.

c. Derive the unconditional factor demand for x_1.

2. Consider an industry with two firms producing the same product. The cost functions of both firms are identical and given by

$$c(y) = y^2 + 1.$$

The inverse demand curve for the product is

$$P(Y) = 150 - 2Y$$
$$Y = y_1 + y_2$$

a. Find the competitive equilibrium price and level of industry output.

b. Calculate the Cournot equilibrium price and amount of output for each firm.

c. Calculate the cartel price and amount of output in the industry.

d. Calculate the Stackelberg equilibrium price and output of each firm assuming that firm 1 behaves as a leader, and firm 2 behaves as a follower.

3. Consider the utility functions for three consumers:,

$$U_1 = 2R^{\left(\frac{1}{2}\right)} + x_1,\ U_2 = R^{\left(\frac{1}{2}\right)} + x_2,\ and\ U_3 = 3R^{\left(\frac{1}{2}\right)} + x_3,$$

where R represents miles of a scenic river to be protected.

Assume that the price of each good is equal to $1.00. Recreation use of the river by the three consumers is nonrival in nature (e.g., congestion is not a problem).

a. State the mathematical condition for Pareto Efficient provision of river miles. Interpret this condition in words. How is this condition different from the mathematical condition for Pareto Efficient provision of a rival, exclusive private good such as bottled water?

b. What is the Pareto Efficient (equilibrium) miles of scenic river to be protected and the Lindahl price (maximum WTP) each consumer should pay to protect river miles?

c. Illustrate your answer to part (b) above graphically.

4. A small exchange economy consists of two consumers, Aplha and Beta, and two goods, X and Y. Alpha and Beta each have an initial endowment of 10 units of X and 6 units of Y.
Alpha's utility function is:

$$U_A\,(X_A, Y_A) = X_A^{.25}\, Y_A^{.75}$$

Beta's utility function is:

$$U_B\,(X_B, Y_B) = X_B^{.75}\, Y_B^{.25}$$

If exchange is allowed between Alpha and Beta and the price of Y, P_Y , is assumed to be 1,

a. What will be the equilibrium price of X?

b. What will be the final consumption level of each good for Alpha and Beta?

5. Discuss the concept of elasticity in general, as well as, specifically, own- and cross-price elasticities and income elasticity.

a. Why is the estimation of elasticities important to researchers of consumer demand, sellers of consumer goods and services, and policy makers?

b. If you conducted an empirical study of demand for a consumer good and found the own-price elasticity to be positive and statistically significantly different from zero, say at the 1% significance level. What would you do or how might you explain (justify) this unexpected result? Would you conclude or suggest that the product in question is Giffen goods?