

Micro Comp re-take questions, May 30, 2008

Note: The questions are labeled by author: (K)hanna, (H)enderson, (O)fek, and (P)ape.
ANSWER ALL QUESTIONS

Section A: (True/False/Uncertain and Justify)

1. (O) "We know from studying the St. Petersburg paradox that risk-neutrality is a good assumption about people's preferences."

2. (O) "The oil industry acts as a monopoly and therefore high oil prices will do little or nothing to help conserve energy."

3. (O) "A good produced by a zero-profit monopoly will not be offered under perfect competition."

4. (O) "If consumer A has utility function $u(x,y) = x^a y^b$ and consumer B has utility function $u(x,y) = a \ln x + b \ln y$, then there should be no difference in the observed market behavior of A and B."

5. (H) True or False (Explain briefly and use an example and/or state assumptions if necessary)? If a firm had decreasing returns to scale at all levels of output and it divided up into two equal-sized smaller firms, the profits would necessarily decrease.

6. (H) True or False (Explain briefly and use an example and/or state assumptions if necessary)? If a firm has increasing returns to scale at all levels of output, profits will necessarily decrease if prices remain fixed and it doubles its scale of operation.

7. (H) True or False (Explain briefly and use an example and/or state assumptions if necessary)? A profit-maximizing competitive firm that is making positive profits in long-run equilibrium may have a technology with constant returns to scale.

Section B:

8. (K) Big Al is an apple farmer who consumes only two goods, apples and the composite good Y , whose price, $P_Y = 1$. His income, all of which he consumes, consists of \$20,000/year plus the revenue he gets from whatever he sells of the 1000 bushels of apples that he harvests every year.

- a. Last year, apples sold for \$10/bushel and Big Al consumed all of his apples (i.e., he did not sell any apples). Draw Big Al's budget constraint for last year and show how many units of Y he consumed.
- b. This year, the price of apples is \$20/bushel, while $P_Y = 1$. On the same diagram as for part (a), draw this year's budget constraint.
- c. Will Big Al be better off this year or last year? (Note: You don't know the exact shape of Big Al's indifference curves, you only know that his preferences satisfy all the axioms of rationality.)
- d. Now assume that Big Al's indifference curves have the usual smooth convex shape. Will this year's consumption of apples be greater than, smaller than, or the same as last year's? What about the consumption of Y ? Will it be greater than, smaller than, or the same as last year's consumption of Y ? Explain using your diagram.

9. (P) In the market for used cars, there are two types: good cars and bad cars. There are two types of people: Buyers and Sellers. Buyers and Sellers are both risk-neutral. Each Seller has exactly one car, and each seller knows the type (good or bad) of his own car. Buyers are each interested in buying one car.

When a buyer and a seller meet, the seller makes a take-it-or-leave-it offer to the buyer for a price p for the car. If the buyer accepts, then the buyer gives $\$p$ to the seller and the seller gives the buyer the car. If the buyer refuses, then the buyer goes home empty handed (utility of zero.) Sellers know the type of the car that they are selling, but buyers do not. Moreover, the sellers have no way of proving what the value of the car is.

The buyers and the sellers value the two types of cars as follows:

	Buyer	Seller
Good Car	400	300
Bad Car	200	150

Suppose that a of the cars are good cars, and $1-a$ of the cars are bad cars.

- a. What are the efficient allocations of cars between buyers and sellers? Explain.
- b. For what a will the equilibrium (market) outcome be efficient? Explain. Also, for those a for which the outcome will not be efficient, describe the outcome.

10. (O) A firm has two plants with cost functions $c_1(y_1) = 4y_1^2$ and $c_2(y_2) = y_2^2$.
What is the cost function for the firm?

11. (K) Comment on the logic of the following quote taken from the *London Times*,
“Some £550 million has been spent on the Concorde to date, £300 million of it by
taxpayers in Britain. If there was a point at which a decision to cancel (the project) should
have been made, it is, with sums like these already committed, long past.”

Section C

12. (O) Let income be given by $y = w + e$, where w is a constant and e is a random
variable distributed with expectation $E(e) = 0$ and $\text{var}(e) = \sigma^2$. Consider the
following equation:

$$U(w - c) = EU(w + e)$$

- (a) Interpret and discuss the meaning of the constant c .
- (b) Derive the relationship among c , σ^2 , and the Arrow-Pratt
measures of risk-aversion.
13. (O) Two players (subscripted $i = 1, 2$) are engaged in a joint project. If each person i
puts in the effort x_i (a nonnegative number smaller or equal to 1) at a cost of
 $c(x_i) = x_i$, the outcome of the project is worth

$$f(x_1, x_2) = 4x_1x_2$$

The worth of the project is split equally between the two players, regardless of
their effort levels. Using best response functions, find all the points of Nash
equilibrium (if any) in this two-player game and the players' payoffs in each.

14. (P) **The Return of the Shoes.** Suppose there is an economy with 100 people, $i=1, \dots, 100$. There are three goods in this economy: money m , left shoes l , and right shoes r . There is no production in this economy. The agents endowments w are as follows:

$$w_1 = (0, 100, 100)$$

$$w_i = (10, 0, 0) \text{ for all } i > 1$$

Everyone's utility function is the same. Right and left shoes are perfect complements:

$$u_i(m, l, r) = m * \min\{r, l\} \text{ for all } i=1, \dots, 100$$

Consider the following questions:

- a. Find all Walrasian equilibria of this economy. Carefully answer the following question: "In equilibrium, what is the price of a right shoe?" Explain.
- b. Suppose you are Agent 2 in this economy. You own a technology that manufactures additional left shoes. Suppose, additionally, that there is no chance of developing a corresponding right shoe technology. Suppose c is the cost of manufacturing left shoes under this new technology. Find the all Walrasian equilibria of this new economy. How much, in dollars, is this technology worth to you?
- c. Suppose right shoes were available for free from a stockpile of old right shoes. Find the all Walrasian equilibria of this new economy. How much, in dollars, is this technology worth to you?