Fall 2012
Economics 202 Final Exam

All the four questions will be given an equal number of points (45). Within each question, the points will be divided roughly equally among its parts (so that all parts will get within 1 point of each other).
Good Luck!

Question 1.

Consider an economy with two goods, which can only be consumed in nonnegative amounts. Consider a consumer whose utility from a consumption bundle $(x_1, x_2) \in \mathbb{R}^2_+$ is given by $u(x_1, x_2) = x_1 + \lfloor x_2 \rfloor$, where $\lfloor x_2 \rfloor$ denotes the largest integer not greater than x_2. Denote the prices of the two goods by p_1 and p_2, respectively, and denote the consumer's wealth by w.

(a) Are the consumer's preferences (i) locally non-satiated, (ii) convex, (iii) continuous, (iv) homothetic?

(b) Draw the consumer's indifference curve passing through the point $(2, 2)$.

(c) Compute the Marshallian demand $x(p, w)$, the indirect utility function $v(p, w)$, the expenditure function $e(p, u)$, and the Hicksian demand $h(p, u)$ for the price region where $0 < p_1 < p_2$.

(d) Compute the same four functions for the price region where $0 < p_2 < p_1$.

(e) How do the answers to parts (c), (d) change if the consumer is allowed to choose negative consumption of good 1?

Question 2.

Consider an exchange economy with two goods and two consumers, in which consumer A's utility function is as described in Question 1, while consumer B's utility from a consumption bundle (x_1, x_2) is given by $u^B(x_1, x_2) = x_1 + \gamma x_2 - (x_2)^2/2$. *Assume that both consumers can consume arbitrary (nevative or positive) amounds of good 1, but only nonnegative amounts of good 2.* Suppose that the aggregate endowment of each good in the economy is 10, and that $2 < \gamma < 10$.

(a) Describe the set of Pareto optimal allocations in this economy as it depends on the parameter γ.

(b) For what values of γ does the conclusion of the First Welfare Theorem hold for this economy?

(c) For what values of γ does the conclusion of the Second Welfare Theorem hold for this economy?

Question 3.

We have K supply observations of a single-output firm that has the shutdown property: at output prices $p_1, ..., p_K$ the firm was observed choosing outputs $y_1, ..., y_K$ respectively, with $0 < p_1 < ... < p_K$. (The firm's input choices are not observed, while the input prices stay the same for all observations.)

(a) What are the simplest possible conditions on the observations that are necessary and sufficient for them to be consistent with profit-maximizing choices by a price-taking firm?

From now on, assume the firm is a profit-maximizing price-taking firm.

(b) What bounds on the firm's profit achieved at price p_K are implied by the observations?

(c) Given the prices $p_1, ..., p_K$ and the observed output y_K at price p_K, what outputs $y_1, ..., y_{K-1}$ would constitute the "worst case" in the sense of maximizing the interval of uncertainty about the firm's profit obtained at price p_K?

(d) Now suppose instead that you are given just one one price-output observation $(p, y) \gg 0$ and can choose $K - 1$ prices at which other observations will be taken. What prices should you choose in order to minimize the "worst-case" interval of uncertainty about the firm's profit obtained at price p?

Question 4.

Consider a decision maker whose preferences over bounded random variables (lotteries) X are represented by the utility function

$$\begin{aligned} U(X) = \mathbb{E}X &+ \gamma\mathbb{E}[X - \mathbb{E}X|X < \mathbb{E}X] \cdot \Pr(X < \mathbb{E}X) \\ &+ \mathbb{E}[X - \mathbb{E}X|X \geq \mathbb{E}X] \cdot \Pr(X \geq \mathbb{E}X) \end{aligned}$$

(a) Give necessary and sufficient conditions on γ for U to represent von Neumann-Morgenstern preferences.

(b) Give necessary and sufficient conditions on γ for the agent to be risk-averse.

(c) Do the agent's preferences exhibit decreasing, constant, or increasing absolute risk aversion?

(d) Assume $\gamma = 2$. Would the agent accept a gamble that increases her wealth by \$40 with probability $\frac{3}{4}$ and decreases her wealth by \$80 with probability $\frac{1}{4}$ at any initial wealth level?

(e) Continue to assume $\gamma = 2$. Would the agent accept a bundle of *four* such bets?

(f) Compare your findings in (d) and (e) to the behavior of expected utility maximizing decision makers.