SOLUTIONS: QUIZ I ECON500, October 1, 2007

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All questions must be answered on this form. You must show your work.
Use the back of this form and the last page as scratch paper—do not use your own paper.

Question 1 Suppose preferences $\succeq$ on $\mathbb{R}^L_+$ are rational and convex, but not necessarily continuous.

Let $x(p,w)$ be the Walrasian demand at prices p and w. Prove that $x(p,w)$ is a convex set if $x(p,w) \neq \emptyset$. 5%

Proof Recall that the preferences are convex if $\{z \in \mathbb{R}^L_+ | z \succeq y\}$ is a convex set for all $y \in \mathbb{R}^L_+$. Let $x, x' \in x(p,w)$ and $\alpha \in [0,1]$.

Let $\alpha \in [0,1]$. We must show that $x'' = \alpha x + (1-\alpha)x' \in x(p,w)$. Let $y = x$ (alternatively, let $y = x'$). By completeness, $x \succeq x$. Since $x' \in x(p,w)$ it follows that $x' \succeq x$. Thus, $x, x' \in \{z \in \mathbb{R}^L_+ | z \succeq y\}$. Since this set is convex, it follows that $x'' \in \{z \in \mathbb{R}^L_+ | z \succeq x\}$. Thus, $x'' \succeq x$. Since $x'' \in B_{p,w}$ (because of convexity of $B_{p,w}$ it follows that $x'' \in x(p,w)$. Thus, $x(p,w)$ is convex.

Question 2 Let $X = \{a, b, c\}$ and $\mathfrak{B} = \{\{a, b\}, \{a, c\}, \{b, c\}\}$.

Suppose that $C(\{a, b\}) = \{b\}$. Define the remaining choices below such that the choice structure satisfies the weak Axiom, such that $C(B) \neq \emptyset$ for all $B \in \mathfrak{B}$ but that the choice is not rationalizable, i.e., there don't exist rational preferences $\succeq$ that generate $C(\cdot)$. 5%

$\boldsymbol{C(\{a, c\}) = \{a\}}$

$\boldsymbol{C(\{b, c\}) = \{c\}}$

Question 3 Suppose a utility function is given by $u(x_1, x_2) = \max\{2x_1, x_2\}$. Then 5%

$$\boldsymbol{x(5, 2, w) = (0, w/2)}$$

(Note that $(5, 2)$ is the price vector).

The consumer spends all of w on good 2. Since $p_2 = 2$, the consumption of good 2 is $w/2$.

Scratch paper: Anything on this page will not be graded.