Midterm Exam

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EI037 Microeconomics

This is a closed book exam. You need to solve this exam alone and independently. Your answers should be legible, clear and concise. In order to get full credit you have to provide complete answers, including how answers are derived. Partial answers will lead to partial credit. Wrong additional statements (i.e., guessing) might reduce the given credit. The exam is 1 hour 50 minutes. Good luck!

1. Weak Axiom of Revealed Preference

The choice structure $(\mathcal{B}, C(\cdot))$ satisfies the **weak axiom of revealed preference (WA)**, iff the following statement holds:

> If for some $B \in \mathcal{B}$ with $x, y \in B$ we have $x \in C(B)$, then for any $B' \in \mathcal{B}$ with $x, y \in B'$ and $y \in C(B')$, we must also have $x \in C(B')$.

1.a. Can you explain the definition of the WA in words?

1.b. Can you explain the definition of the WA in a graph? Can you give one graphical example in which the WA is violated, and one example in which the WA is not violated?

1.c. Show that the WA is equivalent to the following property holding:

> Suppose that $B, B' \in \mathcal{B}$, that $x, y \in B$ and $x, y \in B'$. Then if $x \in C(B)$, $y \in C(B)$, we must have that $\{x, y\} \subset C(B)$ and $\{x, y\} \subset C(B')$.

2. Classic Demand Theory

Consider the utility function

$$u = 2x_1^{\frac{1}{2}} + 4x_2^{\frac{1}{2}}.$$

2.a. Find the demand functions for goods 1 and 2 as a function of prices and wealth.

2.b. Find the compensated demand function $h(.)$.

2.c. Find the expenditure function, and verify that $h(p,u) = \nabla_p e(p,u)$.

2.d. Find the indirect utility function, and verify Roy's identity.

3. Welfare Economics

1.a. Consider a price change from the initial price vector p^0 to a new price vector $p^1 \leq p^0$ in which only the price of good l changes. Show that $CV \geq EV$ if good l is inferior.

1.b. Patrick's utility function is $u(x_1, x_2) = x_1 \cdot x_2$, where good 1 is food and good 2 is housing. Patrick gets a monthly salary of \$3000. The price of good 1 and the price of good 2 are $p_1 = p_2 = 1$. Patrick's boss is thinking of sending him to another town where the price of food is the same, but the price of housing is 2.25. The boss offers no raise in pay. Patrick, who understands compensating and equivalent variation perfectly, complains bitterly. He says that although he doesn't mind moving for its own sake and the new town is just as pleasant as the old, having to move is as bad as a cut in pay of \$A. He also says he wouldn't mind moving if - when he moved - he got a raise of \$B. What are A and B equal to?