Economics 11: Midterm

Instructions: The test is closed book/notes. Calculators are allowed. Please write your answers on this sheet. There are 100 points.

Name:

UCLA ID:

TA:

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Total
Short Questions (25 points)

Question 1

There are two goods, $x_1$ and $x_2$. Preferences are convex and monotone. Are the following statements true or false? Explain your answer.

(a) Indifference curves cannot cross.

(b) There can be a bliss point, where utility is maximised.

(c) Indifference curves have no kinks.
Question 2

Marshallian demand $x_i^*(p_1, p_2, m)$ for good $i$ is homogenous of degree 0 in $(p_1, p_2, m)$. Explain.

Question 3

What is an inferior good? What is a Giffen good? What is the relationship between them?
Question 4

The expenditure function \( e(p_1, p_2, \pi) \) and indirect utility function \( v(p_1, p_2, m) \) are related by the following equation:

\[
e(p_1, p_2, v(p_1, p_2, m)) = m.
\]

What is the intuition behind this equation?

Question 5

There is one good, \( x \geq 0 \). Two agents, \( A \) and \( B \), have utility functions \( u_A(x) = x \) and \( u_B(x) = 2x \). Can we say that one unit of the good makes \( B \) happier than \( A \)?
6. Basic Consumer Choice (25 points)

An agent consumes quantity \((x_1, x_2)\) of goods 1 and 2. She has utility

\[ u(x_1, x_2) = x_1^3 x_2 \]

The prices of the goods are \(p_1\) and \(p_2\). The consumer as income \(m\).

(a) Calculate the agent’s optimal demand. [Note: this problem is well behaved in that the
FOCs are sufficient.]

(b) Calculate the agent’s indirect utility function.

(c) Roy’s identity for good 1 states that

\[ \frac{\partial v(p_1, p_2, m)}{\partial p_1} = -x_1^*(p_1, p_2, m) \frac{\partial v(p_1, p_2, m)}{\partial m} \]

Verify this equation (you need not verify it for good 2).

(d) Provide an intuition for Roy’s identity.
Space for Question 6.
7. **Hicksian Demand (25 points)**

An agent consumes quantity \((x_1, x_2)\) of goods 1 and 2. She has utility

\[
u(x_1, x_2) = -x_1^{-1/2} - x_2^{-1/2}\]

The prices of the goods are \(p_1 = 1\) and \(p_2 = 1\). The target utility is \(\overline{u}\) (note, this will be a negative number).

(a) Derive the agent’s Hicksian demands, as a function of \(\overline{u}\). [Note: this problem is well behaved in that the FOCs are sufficient.]

(b) Derive the agent’s expenditure function, as a function of \(\overline{u}\).
Space for Question 7.
8. New Utility Function (25 points)

An agent consumes quantity \((x_1, x_2)\) of goods 1 and 2. She has utility

\[ u = \min\{x_1 + 2x_2, 2x_1 + x_2\} \]

(a) Draw a typical indifference curve for the agent.

(b) What is the MRS when \(x_1 > x_2\)? What is the MRS when \(x_1 < x_2\)?

(c) The agent has income \(m = 10\). Prices are \((p_1, p_2) = (1, 1)\). Derive Marshallian demand \((x^*_1, x^*_2)\).

(d) The agent has income \(m = 10\). Prices are \((p_1, p_2) = (1, 3)\). Derive Marshallian demand \((x^*_1, x^*_2)\).
Space for Question 8.
Space for Rough Work (Do not write your answers here)