Economics 302
Microeconomic Theory
Fall 2005, Dr. Shirley Liu

Review Questions for Midterm 1

1. Short answer questions:

   (a) Define "Optimal Bundle".

   (b) Define "Diminishing Marginal Rate of Substitution".

   (c) A consumer consumes two bundles: A and B. Suppose we know that $U(A) = 18$ and $U(B) = 9$. Can we say that this consumer prefers bundle A twice as much as bundle B? *Explain.*

   (d) A consumer is currently using all of her income and consuming a bundle X^*. Suppose at her current choice of consumption (X^*): $\frac{MU_1}{MU_2} > \frac{p_1}{p_2}$. How can this consumer change her current consumption choices to make herself better off? *Explain.*

   (e) Suppose a consumer has well-behaved preferences. Without assuming a specific utility function, and based your answer solely on your understanding of "Well Behaved Preferecnes, given the following four bundles, which one would he prefer the most? $A = (10, 30)$; $B = (20, 20)$; $C = (21, 20)$; and $D = (30, 10)$. *Explain.*

2. Tim consumes two goods: $x_1 = $ (juice) and $x_2 = $ (milk). Suppose the price for each bottle of juice is $p_1 = \$2$ and the price for each bottle of milk is $p_2 = \$1$. Suppose Tim's preferences for the two goods can be represented as: $U(x_1, x_2) = x_1 + 2x_2$. Tim has an weekly income of $m = \$90$

   (a) Graphically illustrate Tim's budget set. *Label all axis and intercepts.*

   (b) What is Tim's opportunity cost of consuming one more bottle of juice?

   (c) What is Tim's marginal rate of substitution (MRS)?

   (d) Does Tim's preferences exhibit "Diminishing Marginal Rate of Substitution?

   (e) Tim's preferences is not "Well-Behaved". Which of the four properties of "Well-behaved" preferences does it violate? *Explain.*

   (f) Given the prices and income $(p_1, p_2, m) = (2, 1, 90)$, how many bottles of juice and how many bottles of milk would Tim choose to consume?

   (g) Suppose the government imposes a quantity tax of \$5 on milk. Graphically illustrate all the bundles Tim can afford under this tax scheme. *Label all axis and intercepts.*

   (h) Under the tax scheme in part (g), how many bottles of juice and how many bottles of milk would Tim choose to consume?

3. Sam likes to go to the concerts. Let x_1 = (Number of concert tickets), and x_2 = ($ spent on everything else). Let p_1 = $10, and Sam has a weekly income of $300. Suppose Sam's preferences can be represented as: $U(x_1, x_2) = \text{Min}\{5x_1, x_2\}$.

   (a) Graphically illustrate all the bundles that Sam prefers equally as the bundle $(5, 50)$. *Label all axis and at least two bundles that are equally preferred as $(5, 50)$.*

   (b) Given Sam's preferences and his income, how many concert tickets would Sam choose to purchase?

   (c) Suppose there is a ration on the number of concert tickets each consumer can purchase to be no more than 5, graphically illustrate Sam's budget set under this rationing scheme. *Label all axis, intercepts, and kinks, if any.*

4. Jenny consumes two goods (x_1, x_2). Suppose her preferences can be represented by $U(x_1, x_2)$ $= x_1 x_2^3$. Let (p_1, p_2, m) denote the per unit price of good one, good two, and Jenny's income, respectively.

   (a) Suppose Jenny is currently consuming the bundle $(10, 60)$. How many units of good <u>two</u> would she be willing to give up for an extra unit of good <u>one</u>, for her to stay equally well-off?

   (b) Derive Jenny's demand functions for both goods: $x_1(p_1, p_2, m)$ and $x_2(p_1, p_2, m)$.

   (c) What proportion of her income would Jenny decide to spend on good <u>two</u>?

5. Professor Dwyer has the following grading scheme: There are two exams in her course. Let x_1 = (Grade on Exam 1), and x_2 = (Grade on Exam 2). A student's final course grade is determined by the highest grade of the two exams (i.e. Final Grade = $\text{Max}\{x_1, x_2\}$). John is taking this class and he is determined to get the highest final course grade possible. He decided that he will spend a total of 1200 minutes to study for the two exams. If he spends m_1 minutes studying for Exam 1, he will get a grade of $x_1 = \frac{m_1}{12}$; if he spends m_2 minutes studying for Exam 2, he will get a grade of $x_2 = \frac{m_2}{20}$. If he spends no time studying for either exam, his grade for that exam will be 0.

   (a) Graphically illustrate all the grade combinations (x_1, x_2) that John will like equally as $(80, 40)$. *Label all axis and intercepts, if any.*

   (b) Graphically illustrate all the feasible grade combinations (x_1, x_2) John can get by studying at most a total of $1,200$ minutes for the two exams. *Label all axis and intercepts, if any.*

   (c) Given that John wants to do well in this class, and that he is spending at most $1,200$ minutes studying for the two exams, what would be John's final course grade?