Economics 200: Midterm Exam

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October 30, 2001

You have 80 minutes to complete this exam. The total number of points is 80, so allocate your time wisely. Calculators are not allowed. Please write your name clearly on both of your blue books, and return the question sheet with your blue books.

1. (**Answer in Bluebook #1. 7 points each, 35 points total.**) Please answer with a graph and/or necessary equations, and (where it applies) 2-3 sentences explaining what you are doing.

   (a) Graph the indifference curves generated by $U(x, y) = \min(x, 5y)$. Show at least two different indifference curves, carefully labelling at least two points on each indifference curve, and the utility level attained on the indifference curve.

   (b) Do the utility functions $u(x, y) = 3xy + 2$ and $v(x, y) = \ln(x) + \ln(y) + 9$ represent the same preferences? Explain.

   (c) Do compensated (Hicksian) demand curves always slope downwards? Explain.

   (d) True or false: If my utility function over goods X and Y is $u(x, y) = \sqrt{3x} + y$, my Hicksian demand curve for good X is steeper than my Marshallian demand curve for good X. Explain your answer.

   (e) If an individual's tastes for two goods, X and Y, can be represented by convex, monotonic, and homothetic preferences, can this person's Marshallian demand curve for good X slope upwards? Explain.

2. (**Answer in Bluebook #2. 45 points total.**) The utility function of Danny, a Chicago postal worker, has the form: $U(C, Y) = C^2 Y^{198}$, where C stands for the anti-anthrax antibiotic Cipro (measured in tablets), and Y stands for "everything else" (measured in dollars).

   (a) (*10 points*) Write down expressions for Danny's Marshallian demand functions for Cipro and "everything else," given that the price of Cipro is p_C, the price of everything else is p_Y, and that Danny's income is m. You may derive your answer any way you like, including shortcuts (which are highly recommended!), just be clear as to what you are doing.

(b) (*5 points*) How many tablets of Cipro is Danny consuming per day, if his daily income is \$100, and the price of Cipro is \$2 per tablet? (Observe that $p_Y = 1$.) How would your answer change if we further assumed that Danny can not buy fractional Cipro tablets?

(c) (*5 points*) Danny's cousin, Vinny, is a postal worker in New Jersey. On October 18, 2001, the anthrax virus shows itself in Vinny's workplace. Vinny's utility function over Cipro takes the form $U(C, Y) = \min(8C, Y)$. Assuming that Vinny's income is \$100 per day, how many tablets of Cipro does Vinny consume per day at the price of \$2 per tablet?

(d) (*5 points*) Although Vinny tests negative for anthrax, he continues to consume large amounts of Cipro. To prevent people like Vinny from causing Cipro-resistant strains of Anthrax to evolve, the government decides to limit Vinny's consumption of Cipro by increasing the price of Cipro to \$12 per tablet. How many tablets would Vinny consume at this new price?

(e) (*6 points*) After increasing the price of Cipro to \$12, the government realizes that it is making people like Vinny very unhappy. Therefore, the government decides to mail Vinny a check (every day!) that will make his optimal consumption bundle in (c) still just affordable. How large should this check be?

(f) (*7 points*) How many tablets of Cipro would Vinny consume after receiving the check in the previous question? Given your answer, what are the (Slutsky) income and substitution effects on Vinny's Cipro consumption due to the price change from \$2 per tablet to \$12 per tablet?

(g) (*7 points*) How would your answers to parts (e) and (f) change if the government had decided to send Vinny a check that would keep him as well off as he was before the price increase? Explain your answer.

HAPPY HALLOWEEN!