April 4, 2006

Name:

E-mail: @uiuc.edu

All questions must be answered on this test form! The answers in the boxes count. For each question you must show your work and (or) provide a clear argument. All graphs must be accurate to get credit. If you need scratch paper use the last page or the back of the form.

Question 1 Mary consumes only two goods, pizza and chocolate. The pizza she makes herself, and she produces 120 units. She can sell a pizza for 3 Dollars. Chocolate she must buy for 1 Dollar each. Her preferences are given by $u(C, P) = (C^{1/2} + P^{1/2})$. Her MRS is therefore \sqrt{P}/\sqrt{C} .

(a) Her optimal consumption of pizza and chocolate is

10 points

C = , P = .

(b) Mary realizes that she can sell her pizza at the price of 5 Dollars (instead of 3 Dollars). Then her consumption of pizza increases decreases (mark the correct answer) by units.

- **Question 2** Wendy works in a fast food restaurant. She has 60 hours a week that she can allocate between work and leisure, and she has no income from other sources. The money she earns she spends on consumption, *c*. Her utility function is $u(R, c) = \min\{10R, c\}$, i.e., leisure, *R*, and consumption, *c*, are perfect complements for her.
 - (a) Suppose she can earn 6 Dollars an hour, and she can works as many hours she wishes.

Then she will work

(b) Suppose that her wage is raised to 15 Dollars an hour.

5 points

5 points

Then she will work hours.

(c) Now suppose that Wendy gets 5 Dollars for the first 20 hours and 20 Dollars for every additional hour. Graph her budget line.

5 points



consumption

(d) Using the grid above, determine graphically the optimal consumption choice (recall that for every four units of consumption she wants one unit of leisure!). 5 points

Mary will now work	hours.
--------------------	--------

Question 3 Joe has a credit card that charges an interest rate of 20% per year. This year he has 4,000 Dollars that he can spend. Next year he will have 15,720 Dollars. His utility function is $u(c_1, c_2) = \ln(c_1) + 0.9 \ln(c_2)$, where c_1 is consumption this year, and c_2 next year. His MRS is therefore $c_2/(0.9c_1)$. 15 points

Dollars.

4

- Question 4 Assume that your wealth is 1000 Dollars. This number includes a bicycle which is worth 500 Dollars that you use to get to campus. Your Bernoulli utility function is \sqrt{x} .
 - (a) Assume that the probability that your bike is stolen is 1/5. You can purchase a lock for 40 Dollars which would reduce the probability of theft to 1/50.

The expected utility of buying the lock is .				
The	expected utility of n	<i>ot</i> buy	ing the lo	ck is .
	Therefore you should	buy	not buy	the lock (mark the correct answer)

(b) Suppose again that the probability that your bike is stolen is 1/5 without a lock. In order for you to be willing to buy a lock for 40 Dollars, to what level must using the lock reduce the probability of theft such that you are indifferent between buying and not buying the lock?

The probability must be

5 points

(c) Assume an insurance company offers a bicycle theft insurance. In particular, at a cost of 60 Dollars you can get your bike completely insured against theft (no deductible). Suppose you do not have a lock, so that the probability of theft is again 1/5.



(d) Assume you decided to purchase insurance from another company. At a price of 10 Dollars your receive insurance with a deductible of 20 Dollars. A friend offers to sell you a lock for 5 Dollars. The lock reduces the probability of theft to 1/50. Then

5 points

5 points



Question 5 A person is considering whether to invest *s* Dollars in a stock. The current price of the stock is 5 Dollars. If the stock does well (state *h*) then the stock price will be 8 Dollars. Otherwise, (state *l*) the stock price will be 3 Dollars. Let c_h and c_l denote the person's consumption in the both states. Further, suppose that the person has 5,000 Dollars. Suppose that if *s* of the 5,000 Dollars are invested in the stock, then the remainder, 5, 000 – *s* is left in a bank account that earns zero interest.

Then the budget line equation is given by (fill in the blanks)

12 points

$$c_h + c_l = 5,000$$

Recall that the prices in the above budget line equation are the "state prices", and can be used to determine the price of any other security, whose payoffs depend only on states h on l. For example, suppose that a stock option is worth 3 Dollars in state h and 0 in state l. Then

The price of the option should be

Question 6 A person's utility function is given by $u(x_1, x_2) = x_1x_2$. Thus, the MRS is x_2/x_1 . Suppose that prices are $p_1 = 4$, $p_2 = 1$. What is the least amount of money the person needs to be able to afford a consumption with the same utility as (10, 10).

The person needs m =

13 points

Scratch Paper: Not Graded!!!