Midterm Examination

Intermediate Microeconomics (Honors)

Fall 1997

Name:

Carefully read each question before answering. If a question seems ambiguous, clearly state your interpretation of it before answering. Show all intermediate steps used in arriving at a conclusion. Clearly indicate your final response to each answer.

Part I. True, False, or Uncertain. Write **T**, **F**, or **U** for the response you believe most accurately characterizes the validity of the statement. Give a short but detailed justification of your response in the space provided. Use mathematical, graphical, or verbal arguments as appropriate. Each question is worth 6 points.

1. An individual with a utility function $U(m) = -\exp(-\alpha m)$, with m denoting money and $\alpha > 0$, will refuse the bet in which she receives 2 with probability .6 and loses 2 with probability .4 [assume she has enough wealth to pay the 2 in case of a loss].

2. An individual has a utility function defined over two goods, X and Y. If the income elasticity of X is 1.2 and the income elasticity of Y is .6, the share of X in the individual's budget is 1/3.

3. For a consumer with the utility function $U(X, Y) = .5\ln(X) + .3\ln(Y)$, the Marshallian compensated substitution effect is equal to the Hicksian compensated substitution effect.

4. An individual has a utility function defined over the consumption of a market good and leisure, x and l, which is given by $U(x,l) = x + l$. If the individual has no nonlabor income, her reservation wage will be 0.

5. A Giffen good has a compensated price elasticity of -.1 and an income elasticity of -.5. The share of the good in the consumer's budget is 20 percent.

6. A consumer has a utility function $U(X,Y) = \min[\alpha X, \beta Y]$. The consumer is observed to consume 2 units of X and 3 units of Y. The prices of both goods then change, and the consumer is observed to consume 4 units of X. His new consumption level of Y must be 6 units.

7. A risk-preferring individual will never buy insurance.

Part II. **Problems**.
Answer each part of each of the following problems. Remember to show all of your work.

8. (11 points) The utility function of an individual is given by:

$$U(X,Y) = 10X - .5X^2 + Y. \qquad \#$$

The price of X is equal to 2 and the price of Y is equal to 1. The consumer's income I is equal to 15. Determine his utility-maximizing consumption levels of X and Y.

9. (18 points) An individual has a utility function defined over a consumption good X and leisure l which is given by $U(X,l) = .75\ln(X) + .25\ln(l)$. Her time endowment ($T$) is equal to 24, and her nonlabor income (I) is equal to 144. The price of the consumption good is 1.
   a. Find her reservation wage.

   b. If she is offered a wage of 12, determine how much time she will spend in the labor market.

   c. If the government imposes a tax rate of .25 on labor income and .5 on nonlabor income, what will be the individual's supply of time to the labor market?

10. (14 points) An individual has I dollars and can invest some portion of it in a risky investment. The individual buys the investment for x dollars, and with probability .5 gets back $2x$ and with probability .5 gets back $.5x$. The individual's utility function is $U(W) = \ln(W)$, where W is his final wealth level.
    a. How much should he invest in the risky asset in order to maximize his expected utility [as a function of I]?

    b. If the government taxes net gains on investments at a rate of .5 (and allows no offset for losses), what will his optimal investment be? [Hint: First compute the expected monetary value of the investment under this tax.]

11. (18 points) An individual lives for two periods and seeks to maximize her expected lifetime income. If she stays out of the labor market, her income is 0 in each period she doesn't participate. If she searches for a job, she pays a cost of 2 in each period in which she searches. Every period in which she searches she is offered a job. With probability .25 the job offer pays 1 in each period of employment, with probability .5 it pays 5 in every period of employment, and with probability .25 it pays 9 in every period of employment. If the individual accepts a job in the first period she keeps the same job in period 2. Jobs begin in the period in which they are accepted.
    a. If the individual enters her second period of life without a job, will she search for one? If so, which wage offers will she accept?

    b. Will the individual search for a job in her first period of life? If so, which wage offers will she accept?

    c. What is the probability that the individual will be without a job during period 1? What is the probability she will be without a job during period 2?