

Name _____
Sign the pledge:
No Aid; No Violations _____

Mike Lovell
9:00-12:00, December 18, 1997
Room PAC 107

Econ 271: Final Examination

Please Note:

- The exam will end at 12:00 noon! Budget your time carefully
- **Help!** I will not remain in the classroom during the examination, but I will drop in occasionally to answer any questions you may have. If you have a serious problem, you may find me in my office, room 308 PAC, x2355
- Save time to read over your answers and make corrections at the end of the test.
- Start your answers in the space provided, but continue if necessary on the back of the page or on a separate sheet of paper. Extra sheets are available in the front of the room.
- Show your calculations in order that you may receive partial credit even if you make a numerical error.
- When you finish the exam, please leave it on the table in the front of the room and leave the room quietly.
- If you would like me to mail your exam to your home, leave a stamped addressed envelope in the slot for this course in the Economics/Sociology Alcove. Otherwise, your work will be returned to the alphabetical slots in the Alcove to be picked up at the start of classes for the second semester.
- If you want additional feedback on any aspect of your work in this course, please contact me at your convenience for an appointment.

I. [20 points] Answer 4 of the following Short Answer Questions

1. The graph shows the of Albert and Barbara demand curves for cake. Determine the demand elasticities at points a, b and c.

2. In Never-Never Land the annual demand for petroleum products is $Q = 50,000 p^{1/2}$. The total supply of heating oil is 1,000,000.
- a. If the price of heating oil is $p = \$1.00$ today (1997) and for ever more, consumption of heating oil will be _____ per year, but the stock of oil will be exhausted after _____ years.
- b. You own an oil well with an estimated capacity of 1,000. If you expect the price to remain at \$1.00 for ever more but the rate of interest for funds on deposit in Switzerland is 20%, how much oil will you pump out of your well? _____. If you expect the price of oil to increase at 30% per annum, how much oil would you pump this year? _____. Why?
3. Explain carefully the meaning and economic significance of each term in the following equation. How does the equation simplify under competitive market conditions?

$$\frac{\partial q}{\partial L} p + q \frac{dp}{dq} = w + \frac{dw}{dL} L.$$

4. Explain carefully the meaning and economic significance of each term in the following equation:

$$\frac{\partial d_x}{\partial Y} = \frac{\partial X}{\partial P_x} \Big|_{U = \text{constant}} - X \frac{\partial X}{\partial I}$$

5. Thrifty Sam has an income of \$1,000 in 1997 and expects an income of \$1,000 in 1998. He can borrow or lend at interest rate $r = 25\%$. What is the budget constraint explaining his consumption options for years 1997 and 1998, assuming that he dies on Dec 31, 1998.
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Part II Answer Four (only 4) of the following five questions ~ NO MORE! [20 points each].

1. **MARKETS:** Consider the demand and supply curve graph for sugar in the State of Autarchy.
 - a. The equilibrium price of sugar is _____ cents and the equilibrium quantity _____. Consumer surplus is _____.
 - b. The elasticity of demand at the above price is _____ (explain).
 - c. The world price of sugar is 30 cents per pound, including transportation costs but none has been imported because of a \$20 cents per pound tariff on sugar imports. The President of Autarchy proposes the repeal of the sugar tariff. This would mean that sugar could be freely imported into Autarchy without restriction at the world price of 30 cents per pound, including transportation costs. If the tariff is repealed, the new equilibrium price will be 30 cents; imports will be _____; domestic production will be _____; consumer surplus will be _____.
 - d. The National Association of Sugar Producers opposes the removal of the tariff, arguing that it will create undue hardship for the industry and generate unemployment. The Chair of the Senate Agricultural Committee reviewing the President's plan reports that it will be voted down unless the bill is amended to include a government subsidy of 10 cents per pound to each domestic producer. As a result, the price of the commodity will be _____ cents, domestic production will be _____, imports will be _____ and consumers surplus _____. The subsidy will cost the government _____.
 - e. Because of your expertise in economics, you have been called upon to testify before the Agricultural Committee. Some Senators argue that the subsidy would be worse than the protective tariff. Some argue that it is a politically feasible second-best solution. The Senators want you to determine whether it would be better to remove the tariff and pay the subsidy or keep the tariff in place. What do you recommend? Why?

RENT: You can legally drive a taxi in New York City only if you display a Medallion issued by the city's Taxi and Limousine Commission. (A Wesleyan diploma is no substitute for a medallion.) Since the system was established in 1937, the number of Medallions has been frozen at 11,787. For 70 years the only way to acquire a medallion has been to buy it from a previous owner. In 1950 a Medallion could be purchased for about \$5,000, in 1970 a Medallion was worth about \$28,000, in 1980 \$68,000 and in 1995 about \$200,000. Medallions are usually bought with borrowed money, and it is estimated that there is more than \$1 billion outstanding on such loans. If the interest rate on such a loan is only 10%, a cabby must pay \$20,000 per year in interest on the Medallion, which is more than the cost of the cab!

- a. Suppose that instead of the system of Medallions, the Taxi and limousine Commission auctioned off to the highest bidder 11,787 annual Taxi permits. How much revenue do you estimate the city could have collected in 1995 from the annual auction? Explain.

- b. The Medallions are here to stay, but suppose that the City of New York were to impose a \$10,000 annual renewal fee for each Medallion. Your Medallion would expire if you did not pay the annual fee. How would the fee affect the profitability of driving a hack and the market value of a Medallion?

- c. Forget about the renewal fee. Suppose that the interest rate had fallen from 10% to 5% in 1996. Estimate the effect on the value of a Medallion, assuming for simplicity that the interest rate is expected to remain at 5% for ever more and that no changes are expected in the number of cabs, or the demand and supply conditions for taxi rides.

- d. In the 1980s former Mayor Edward I. Koch wanted to issue 1,900 additional medallions to be given away by lottery. In 1995 Mayor Rudolph W. Giuliani proposed to sell 400 new medallions in order to raise revenue. Increasing the number of taxi's would obviously make it easier to get a ride, but it might also increase congestion and pollution. But how would you expect an increase in the number of Medallions to affect their value and the cost of operating a cab? Explain.

3. EXPECTED UTILITY MAXIMIZATION:

Martin's current wealth (including his car) is \$100,000. He faces a 25% probability of losing his \$20,000 automobile through theft during 1998. For simplicity, assume that if the car is stolen it will be a total loss.

- a. What is the expected end-of-year value of the car.

- b. Suppose that Martin's utility function is $U = \log(Y)$, What is Martin's expected utility? Hint:
 $U(5,000) = 3.699$, $U(20,000) = 4.301$, $U(80,000) = 4.903$, $U(90,000) = 4.954$, $U(92,500) = 4.966$,
 $U(95,000) = 4.978$, $U(100,000) = 5$, etc.

- c. Would Martin buy theft insurance at an annual premium of \$5,000? Would he buy theft insurance if the annual premium was \$7,500. Explain

- d. Is Martin risk adverse or is he a risk lover? Explain.

- e. Insurance companies worry about both "moral hazard" and "adverse selection." Explain what is meant by these concepts within the context of this problem.

5. WORK: Suppose that worker Jones has the following utility function, where C is consumption (measured in dollars) and H is hours of leisure. Let $L = (24-H)$ equal hours of work. Then if w is the wage rate we have $C = wL = w(24-H)$. Suppose that Jones has utility function $U = C^{1/3}H^{2/3}$.
- a. How many hours will Jones work if $w = \$10$
- b. How many hours will Jones work if an income tax reduces the wage to $w = \$7.50$?
- c. Suppose that the wage remains at $\$10$ but as a result of an inheritance from his late uncle Buddy he is able to consume $C = 10 + wL$. (His uncle's will provided that the inheritance would be placed in a trust paying $\$10$ per day). How many hours per day will Jones work?

6. MONOPSONY:

Congratulations, you are president of Mono company, a firm that sells its output at price $p = 6 - 0.02q$.

Your firm hires labor at a daily wage rate of $w = 5 + 0.1L$

Your production function is $q = 2L$ (no capital or raw materials are utilized).

- a. The total revenue function is $R(q) =$
- b. Total revenue as a function of labor is $R^*(L) =$ _____
Thus if $L = 2$, $q = 4$ and $R^*(2) = R(4) = \$$ _____
- c. Labor costs total $wL = \$$ _____
- d. Profits as a function of the level of employment are $\pi(L) =$
- e. Determine how many workers your firm should employ in order to maximize profits:
- f. If the firm maximizes profits, the wage will be $w =$ _____, the price will be $p =$ _____, revenue will be _____, labor costs will be _____ and profits _____.
- g. Suppose Congress enacts a minimum wage that requires that the firm pay workers no less than \$7.00 per day. Determine the profit maximizing level of employment.

Honors Option:

No partial credit; please review your answers to the main part of the quiz before attempting this question.

Prove the following proposition or provide a valid counter-example:

If an individual is a utility maximizer, the sum of the demand plus price elasticities must equal zero!

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YOU EARNED IT***