Name:

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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 300 units. She can sell a pizza for 4 Dollars. Chocolate she must buy for 1 Dollar each. Her preferences are given by $u(C, P) = (C^{-1} + P^{-1})^{-1}$. Her MRS is therefore P^2/C^2.

(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 9 Dollars (instead of 4 Dollars). Then her consumption of pizza **increases** **decreases** (*mark the correct answer*) by **units.** *10 points*

Question 2 Wendy works in a fast food restaurant. She has 80 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 $u(R, c) = \min\{4R, c\}$, i.e., leisure, R, and consumption, c, are perfect complements for her. In particular, for each unit of leisure she wants to have 4 units of consumption.

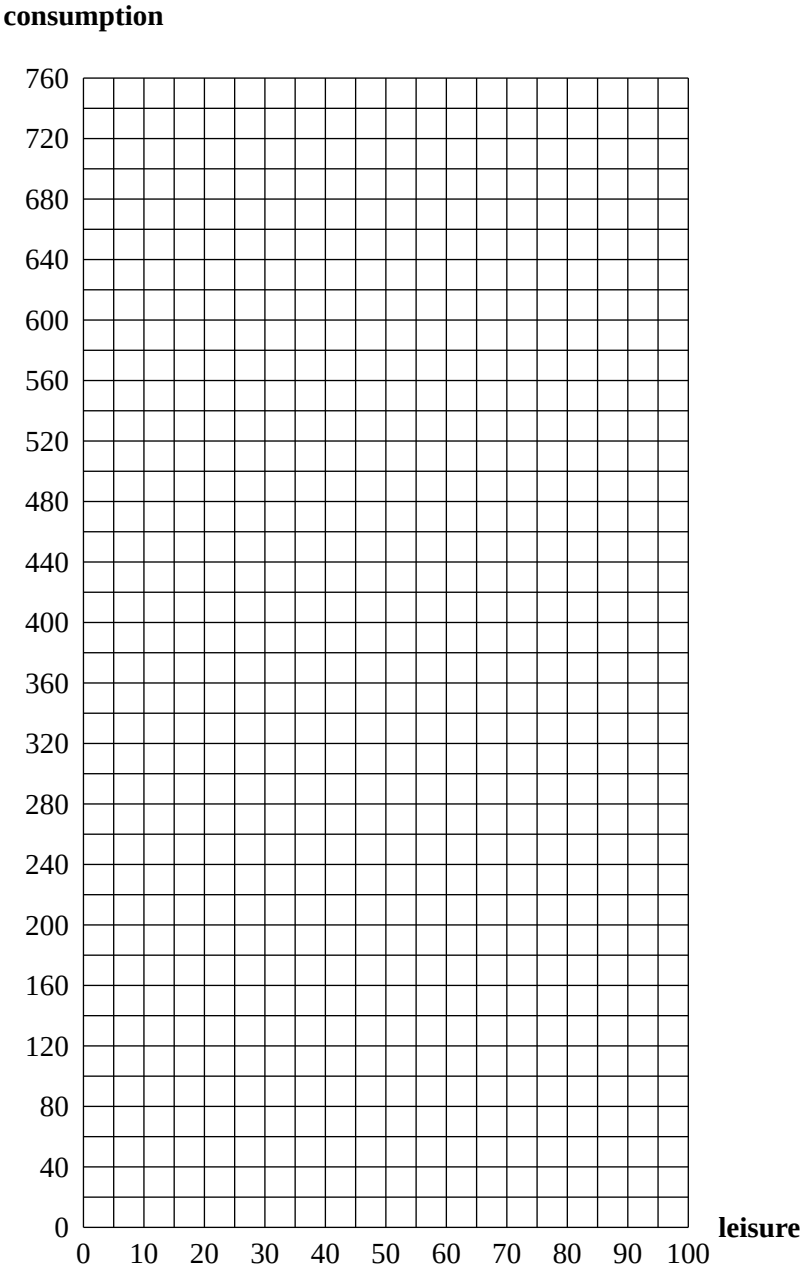
(a) Suppose she can earn 4 Dollars an hour, and she can works as many hours she wishes. *5 points*

Then she will work	**hours.**

(b) Suppose that her wage is raised to 8 Dollars an hour. *5 points*

Then she will work	**hours.**

(c) Now suppose that Wendy gets 4 Dollars for the first 30 hours and 12 Dollars for every additional hour. Graph her budget line. *5 points*



(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 15% per year. This year he has 2,000 Dollars that he can spend. Next year he will have 19,550 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*

Then Joe will borrow	**Dollars.**

Question 4 Assume that your wealth is 1000 Dollars. This number includes a bicycle which is worth 400 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 1/10. You can purchase a lock for 30 Dollars which would reduce the probability of theft to 1/25. Then *5 points*

The expected utility of buying the lock is .

The expected utility of *not* buying the lock is .

Therefore you should **buy** **not buy** the lock (*mark the correct answer*).

(b) Assume again that the probability that your bike is stolen is 1/10 without a lock. In order for you to be willing to buy a lock for 30 Dollars, to what level must using the lock reduce the probability of theft such that your are indifferent between buying and not buying the lock? *5 points*

The probability must be .

(c) Assume an insurance company offers a bicycle theft insurance. In particular, at a cost of 50 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 1/10. *5 points*

The expected utility when being insured is .

The expected utility when being uninsured is .

Therefore you should **get insurance** **remain uninsured** (*mark the correct answer*).

(d) You decided to purchase insurance from another company. At a price of 10 Dollars your receive insurance with a deductible of 40 Dollars. A friend offers to sell you a lock for 4 Dollars. The lock reduces the probability of theft to 1/25. Then *5 points*

The expected utility of buying the lock is .

The expected utility of *not* buying the lock is .

Therefore you should **buy** **not buy** the lock (*mark the correct answer*).

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 7 Dollars. Otherwise, (state l) the stock price will be 4 Dollars. Let c_h and c_l denote the person's consumption in the both states. Further, suppose that the person has 10,000 Dollars. Suppose that if s of the 10,000 Dollars are invested in the stock, then the remainder, $10,000 - s$ is left in a bank account that earns zero interest.

Then the budget line equation is given by (fill in the blanks) *12 points*

$$\square\, c_h + \square\, c_l = 10,000$$

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 $u(x_1, x_2) = x_1 x_2$. Thus, the MRS is x_2/x_1. Suppose that prices are $p_1 = 1$, $p_2 = 2$. What is the least amount of money the person needs to be able to afford a consumption with the same utility as $(20, 90)$. *13 points*

The person needs $m =$.

Scratch Paper: Not Graded!!!