YOUR NAME: Monday, May 15, 2000

YOUR NUMBER:

Final Exam   Economics 304K
Professor R. P. McAfee
University of Texas at Austin

Instructions: You will have 150 minutes for the exam. Points total 100. Do not cheat. Raise your hand if you have a question, but continue to work on the exam while waiting for your question to be answered. Allocate your time like an economist would - do the easy/valuable questions first. Short answer questions should not require more than two lines. Question values are in parentheses. Use the back of the page as scratch paper.

(2 points)   1. Draw and label a market with a perfectly elastic demand and a perfectly elastic supply.
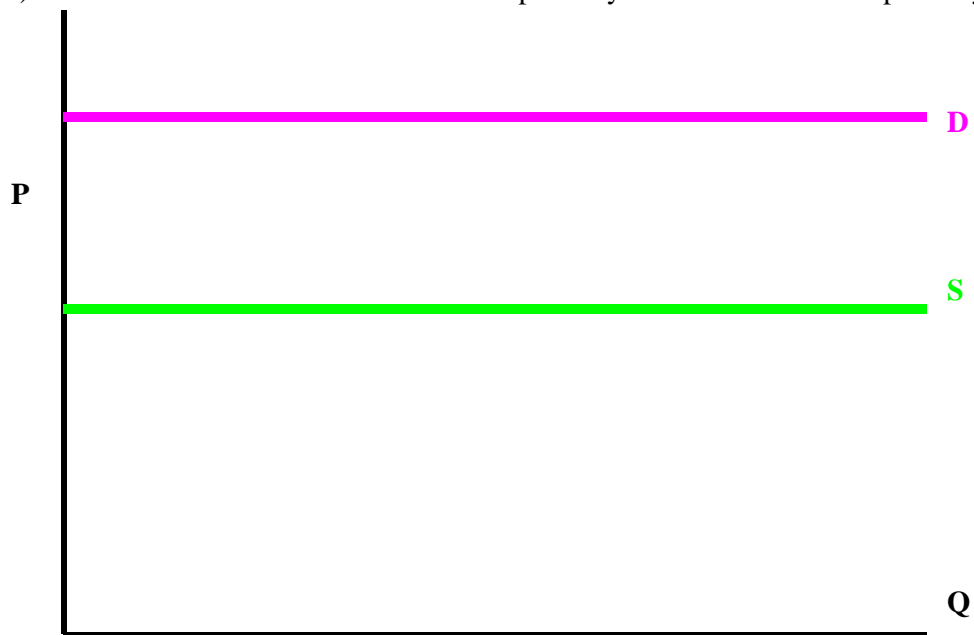
(3 points)   2. (Short answer) What is an normal good, as economists use the term? Provide an example.

Demand for a normal good rises with income; most goods are examples, such as cars, computers, stereo, coffeemakers, TVs, etc.

(4 points) 3. Suppose the elasticity of demand is 2, the ela sticity of supply is 1, and a 10% tax is imposed. By what percentage does revenue change?

$-2(10-\%\Delta P_S) = -2\%\Delta P_D = \%\Delta Q = \%\Delta P_S$

Thus $\%\Delta Q = \%\ddot{A}P_S = -20/3\% = -6.66\%$

Thus, revenue falls to $.933P \times .933Q = .87\ PQ$.

Revenue falls by approximately 13%.

(6 pt) 4. Bowties and neckties are substitutes in demand.

(i) (Short Answer) If the supply for bowties falls, but the supply for neckties is unchanged, what will happen to the prices of bowties and neckties?

The price increase in the bowtie market (illustrated in blue) causes an increase in demand in the necktie market, thereby increasing price in that market as well.

(ii) Illustrate your answer with supply and demand diagrams:
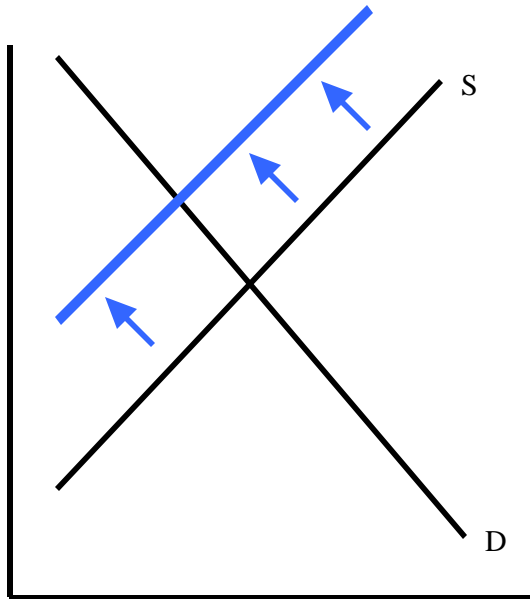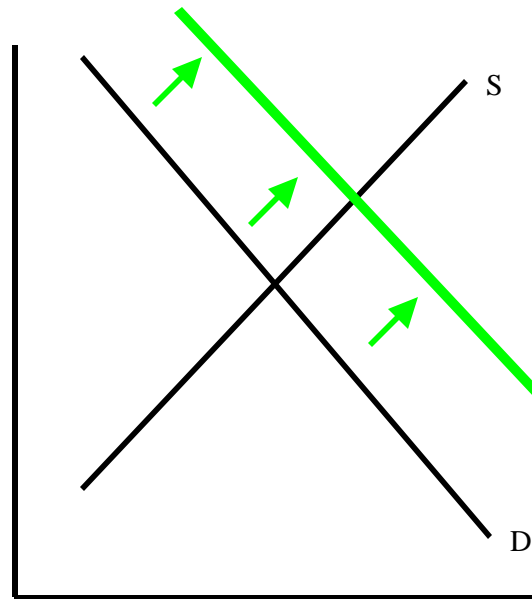
Bowtie Market   Necktie Market

5. (3 points, short answer) Does it matter whether a sales tax is imposed on the buyer or on the seller? Why or why not?

A tax imposed on buyers will leave the price the buyer pays, the price the seller gets, and the quantity the same as an equivalent tax imposed on the sellers. In either case, the difference between the price the buyer pays and the price the seller gets is the tax, and these prices must be associated with the same quantity, for otherwise either a shortage or surplus arises.

(9 pt) 6. Consider a competitive market with 8 consumers, each of whom will buy at most one unit of the good, and 9 sellers, each of whom will sell at most one unit of the good. The distribution of buyer values (or buyer reservation prices) is as follows:

Buyer Value	Number of Buyers
$4	4
$6	2
$8	2

The distribution of seller costs (or seller reservation prices) is as follows:

Seller Cost	Number of Sellers
$3	3
$5	3
$7	3

6 (i). In this market, what price (P) and quantity (Q) would arise in a competitive equilibrium?

P=5, Q=4

6 (ii) What are seller profits?

3 sellers earn $2 each for a total of $6.

6 (iii). How large is consumer surplus?

2 consumers earn $3 each, and 2 more earn $1, for a total of $8.

6 (iv). If the good creates a **positive** externality of $2 per unit sold, what is the efficient quantity?

6

6 (v). What level of tax or subsidy imposed on the sellers will lead to an efficient allocation?

A subsidy of $2.

6 (vi) Draw the supply and demand diagram for this market, and illustrate the effect of the tax or subsidy you found in part (v), assuming that tax or subsidy is imposed on the sellers.
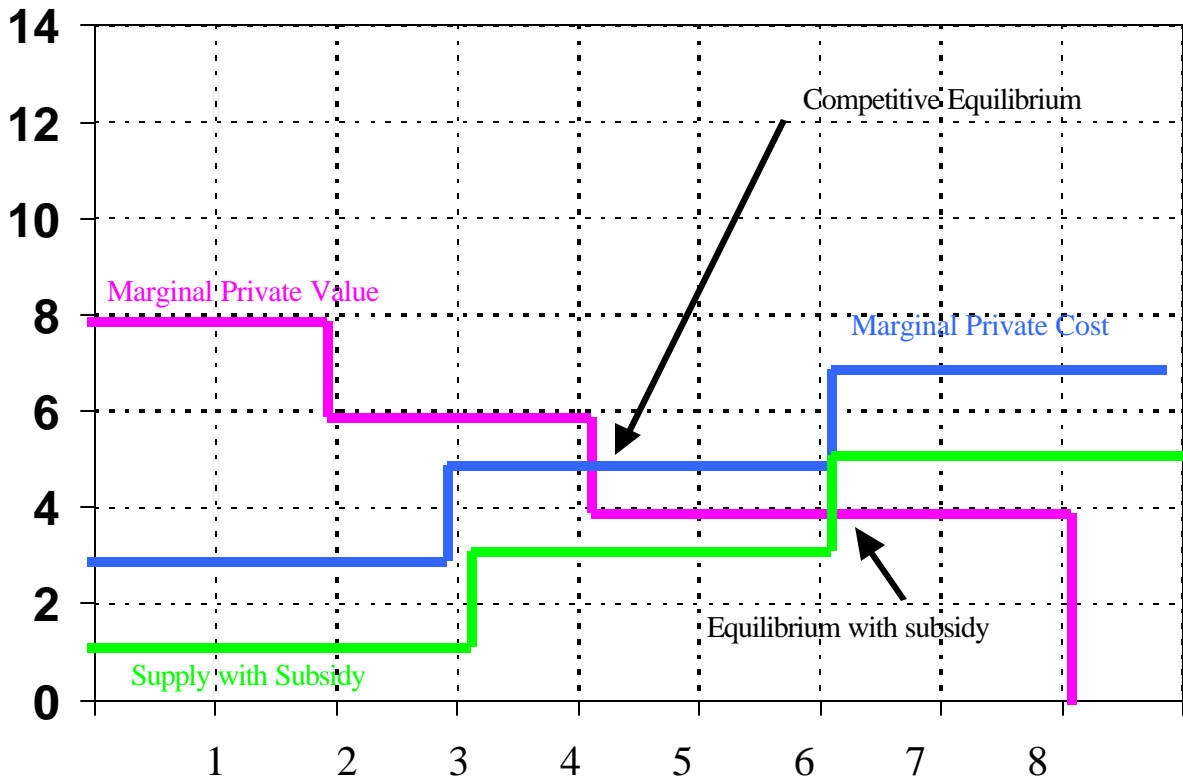
7. (6 points) The Distant Early Warning System detects incoming missile attacks in time to fire missiles and get planes into the air before they are destroyed by the attack. Suppose that the distant early warning system has gone blind and that this is known to both the US and the USSR (take these two to be enemies). Both sides can either fire their missiles, or not. If neither fires, the US gets 10 and the USSR gets 2. If the US fires and the USSR does not, the US gets 8 and the USSR gets nothing. If, in contrast, the USSR fires and the US does not, the USSR gets 8 and the US gets nothing. If both fire, both get 1. Fill in the game payoffs and compute the equilibria.

		USSR	
		Fire	Don't
US	Fire	(1,1)	(8,0)
	Don't	(0,8)	(10,2)

7. (ii) What outcome(s) are predicted? In actual fact, neither side fired their missiles. Is this consistent with the predicted outcome? Comment on the applicability of this game to the problem of nuclear deterrence.

The only equilibrium, and the predicted outcome, is for both to fire. This is not consistent with both sides not firing. Something must be wrong with the formulation of the game – perhaps the gain to the USSR of firing when the US doesn't is wrong, or perhaps the US can react to the firing of the USSR and thus reduce the USSR payoff to 1. Cooperation based on tit-for-tat or trigger strategy logic is insufficient – the ability to annihilate an adversary precludes punishment strategies considered in class.

8. (short answer -- 3 points) What is an advantage of rate-of-return regulation over price regulation?

Ease of implementation, reduced informational requirements

9. (short answer -- 3 points) What is an advantage of permitting the resale of pollution permits?

Resale uses pollution to maximum effect, minimizing the amount of pollution necessary to produce a given level of output for any given costs.

10. (short answer, 5 points) If an industry is competitive, what share of a tax is paid by consumers in the long run? Why? No diagrams are necessary to answer this question.

100% -- in long run competitive equilibrium, firms earn zero economic profits, and thus all costs, including taxes, are paid by consumers.

11. (6 points) Which of the following are examples of price-discrimination? Explain briefly.

(i) "Early-bird" special which discounts meals prior to 5PM

No, an earlier meal is a separate product.

(ii) A coupon to buy one, get a second at half-price

Yes, this is a quantity discount.

(iii) Six rolls of paper towels, packaged together, sell for the same price as three individual rolls

Yes, this is a quantity discount.

(iv) Ten percent off given to students at the bookstore

Yes, this discriminates on the basis of the identity of the buyer.

(v) Airline tickets with a Saturday-night stayover requirement are 1/3 of the price.

Yes, because consumers can put two round trips together, disposing of the return trip in such a way to purchase a ticket without a Saturday night requirement, at 2/3rds of the price.

(vi) IBM LaserPrinter E

Yes, as discussed in class, this represents the manufacturer producing a damaged version of the good and selling the damaged version, which is more expensive to produce, for less.

12. (5 points) Fill in the following table. Ignore blacked out spaces.

Output	Total Cost	Variable Cost	Fixed Cost	Marginal Cost	Average Total Cost	Average Variable Cost	Average Fixed Cost
0	6	0	6				
1	12	6	6	6	12	6	6
2	20	14	6	8	10	7	3
3	30	24	6	10	10	8	2
4	42	36	6	12	10.5	9	1.5
5	56	50	6	14	11.2	10	1.2

13. (5 points, short answer) Describe the effects of a strict rent control law on the quantity of housing offered, the quantity demanded, the prevailing price and the dead weight loss (excess burden). What kinds of illegal behavior might arise to circumvent the law?

Rent control will reduce the quantity of housing available (more in the long run than the short run), reducing the legal price. There is excess demand at this price, thus creating an excess burden. Key money, bribing apartment managers, descendants of deceased tenants pretending to be the tenant are all examples of illegal behavior.

14. (4 points) A monopolist faces the following demand curve. Fill in the missing rows and compute the price that maximizes profit.

| Price	10	9	8	7	6	5	4	3	2	1
Quantity	0	1	2	3	4	5	6	7	8	9
Revenue	0	9	16	21	24	25	24	21	16	9
MR	--	9	7	5	3	1	-1	-3	-5	-7
MC	1	1	1	2	2	2	3	3	4	5

Profit maximizing price =6

15.   (6 points) There are many bagel restaurants in the United States. Consider the supply of bagel sandwiches as a competitive industry in long run equilibrium. Now suppose that consumer tastes change and the demand for bagels drops substantially. Trace out the short and long run effects (on quantity, price, the number of suppliers and supplier's profits) of this demand decrease. You will need two diagrams, one for the market and one for the firm.

The decrease in demand causes a decrease in the price and quantity traded. If the price falls below minimum average variable cost, there will be shut down, to keep the price at this level. Over time, as equipment wears out, firms exit, shifting in the short run supply. This will cause the price to rise, until the price returns to long run equilibrium.
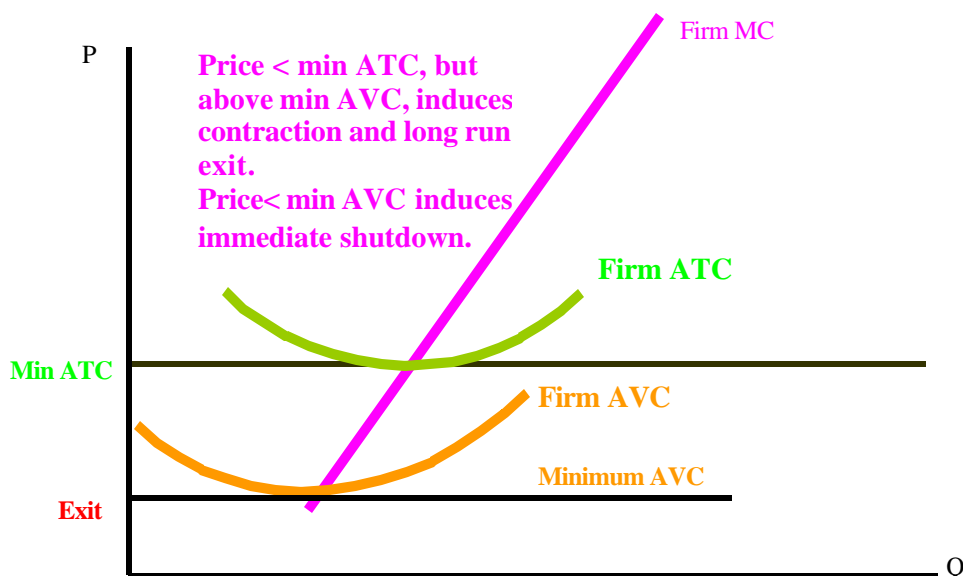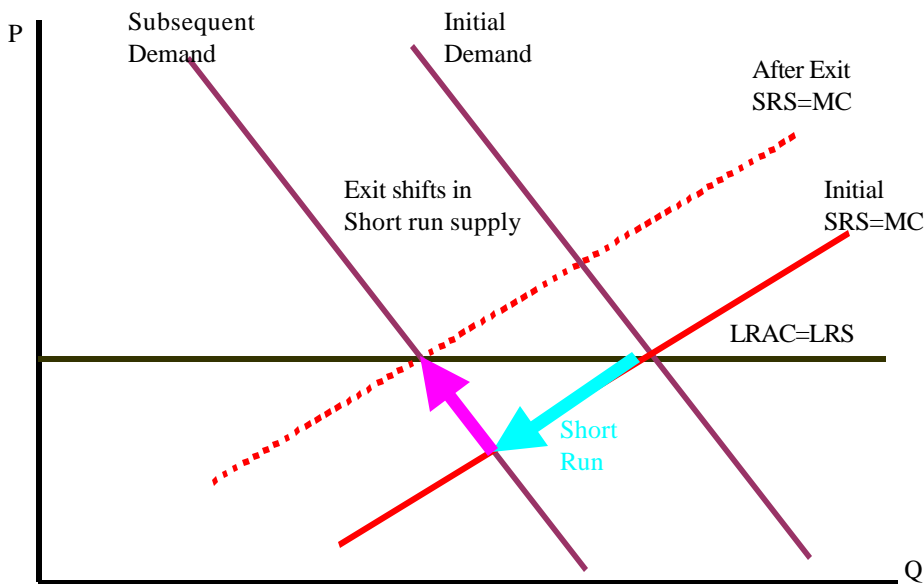
16.   (6 points) Adrian and Barbara are having a dinner party. Adrian can make two pastries per hour, or one quiche per hour. Barbara can make two pastries per hour, or three quiches per hour.

(i)   Draw and label Adrian's and Barbara's production possibilities frontiers if they have one hour to work.

Pastries

2

Barbara

Adrian

Quiche

1   3
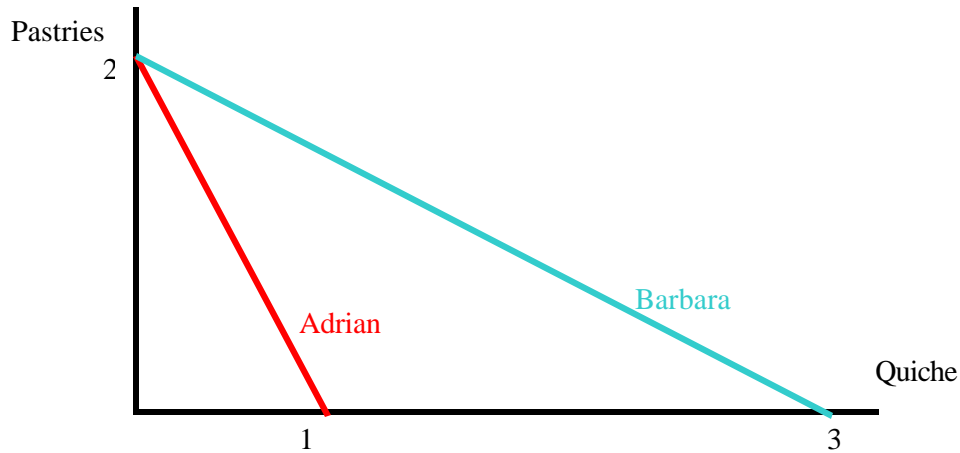
(ii)   Who has the comparative advantage in making pastries? Does either have an absolute advantage? Why?

Adrian has a comparative advantage at pastries, because he only gives up 1 quiche to make 2 pastries, while Barbara gives up three. Barbara has the absolute advantage, because she can have more of both.

(iii)   Suppose Adrian and Barbara want to produce twelve pastries and twelve quiches. What is the minimum amount of time it will take the pair of them to do so? Provide the logic supporting your solution

Put them producing their comparative advantage. Barbara finishes all the quiches in 4 hours. At this point, Adrian has made 8 pastries, and there are four to go. Now put both on pastries. They produce those 4 pastries in one hour, for a total of five hours.

17. (1½ points each) For the following six games **circle** the pure strategy equilibria. Drawing the arrows in *not* enough! Do not compute mixed strategy equilibria even if they exist!

(i)

Ann	Bob	Left	Right
	Up	(3,2)	(11,1)
	Down	(4,5)	(8,0)

(ii)

Ann	Bob	Left	Right
	Up	(3,3)	(0,0)
	Down	(4,4)	(6,6)

(iii)

Ann	Bob	Left	Right
	Up	(0,1)	(1,0)
	Down	(1,0)	(0,1)

(iv)

Ann	Bob	Left	Right
	Up	(7,2)	(0,9)
	Down	(8,7)	(8,8)

(v)

Ann	Bob	Left	Right
	Up	(1,1)	(2,4)
	Down	(4,1)	(3,2)

(vi)

Ann	Bob	Left	Right
	Up	(4,2)	(2,3)
	Down	(3,8)	(1,5)

18. (3 points each) For the following two games, compute the mixed strategy equilibria. What is the probability that Bob plays Left and the probability that Ann plays Up?

(i)	Bob		
		Left	Right
Ann	Up	(0,2)	(2,0)
	Down	(1,2)	(1,3)

(i) Probability that
Ann plays Up: 1/3
Bob plays Left: 1/2

Let p be the probability Ann plays up. Then if Bob plays left, he gets 2. If he plays right, he gets 3 with probability 1-p. Setting these equal gives p = 1/3.

Let q be the probability that Bob plays left. If Ann plays up, she gets 2 with probability 1-q, and 0 otherwise. She gets 1 if she plays down. Thus q=1/2.

(ii)	Bob		
		Left	Right
Ann	Up	(1,3)	(3,1)
	Down	(2,2)	(1,3)

(ii) Probability that
Ann plays Up:1/3
Bob plays Left:2/3

Let p be the probability Ann plays up. Then if Bob plays left, he gets 3p+2(1-p). If he plays right, he gets 1p+ 3(1-p). Setting these equal gives 2p=1-p, or p = 1/3.

Let q be the probability that Bob plays left. If Ann plays up, she gets 1q+3(1-q). She gets 2q+(1-q) if she plays down. Thus 2(1-q)=q, or q=2/3.

19. (Short answer, 3 points) Consider a game between Ann and Bob. Now consider a second game that differs from the first in that $2 is added to Ann's payoffs for each outcome. What relationship do the equilibria of these games have? Explain briefly.

These two games have the same equilibria. Ann gets the $2 no matter what she does, and no matter what Bob does, so it won't have an effect on either party's incentives.

20. (short answer, 3 points) What is the winner's curse? How does one adjust for the winner's curse?

The most optimistic bidder, that is, the bidder who most overestimates the value of the object being sold, tends to win the bidding. Bidders should reduce their value estimates to account for the fact that overoptimism about value is associated with winning.

21. (short answer, 3 points) What is an advantage of an English (oral ascending) auction over a sealed-bid auction?

The English auction releases information about value to the bidders during the bidding process, thereby reducing the winner's curse, encouraging bidders to be more aggressive. Prices tend to more closely reflect actual value.