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.

Review the earlier exams!

(4 points) Suppose the elasticity of demand is 1, the elasticity of supply is 2, and a 20% tax is imposed on the sellers. What happens to price and quantity?

The quantity demanded falls by $1 \times (\%\Delta p)$. The quantity supplied falls by $2 \times (\%\Delta p\text{-}20)$. These are equal, so $\%\Delta p = 2 \times (20\text{-}\ \%\Delta p)$. Thus, $\%\Delta p = 40/3$ and $\%\Delta q = -\ \%\Delta p$.

(10 points) Armani must decide if it is going to make narrow or wide ties next year. At the same time, Ripov Enterprises, another tie manufacturer, must decide if it is going to make narrow or wide ties next year. If Armani makes a different style of tie than Ripov, Armani earns $20 and Ripov earns nothing. If Armani makes the same style of tie as Ripov, both Armani and Ripov earn $10.

(i) Fill in the game matrix with the appropriate payoffs.

		Ripov	
		Narrow	Wide
Armani	Narrow	(___,___)	(___,___)
	Wide	(___,___)	(___,___)

(ii) Find all equilibria to this game (both pure and mixed). How likely are they to produce the same style of tie?

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(i) Fill in the game matrix with the appropriate payoffs.

		Ripov	
		Narrow	Wide
Armani	Narrow	(5,5)	(20,0)
	Wide	(20,0)	(5,5)

(ii) Find all equilibria to this game (both pure and mixed). How likely are they to produce the same style of tie?

No pure strategy. A 50/50 mixed exists. This gives the same style half the time.

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

Price regulation gives strong incentives to minimize cost.

(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.

Since firms earn zero profits in the long run, 100% is paid by consumers.

What is price discrimination? Give two examples.

Price discrimination is charging different consumers different prices for the same object. Examples include Saturday night stayover discounts for airline flights, student discounts, senior citizen discounts, buy one get one at half price, …

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

Price	7	6	5	4	3	2	1
Quantity	0	1	2	3	4	5	6
Revenue							
MR							
MC	1	1	1	1	1	1	1

Profit maximizing price =

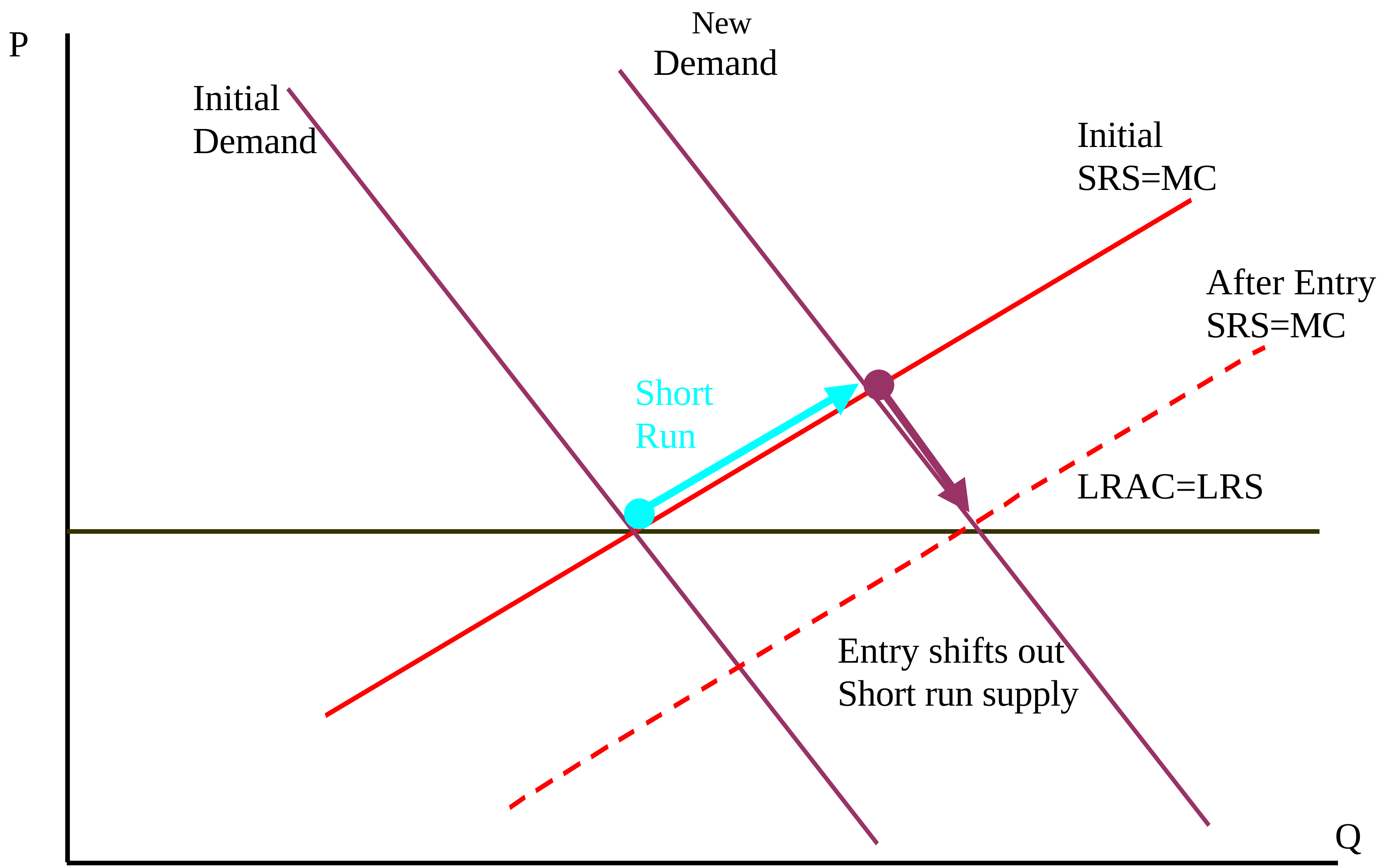
Price	7	6	5	4	3	2	1
Quantity	0	1	2	3	4	5	6
Revenue	0	6	10	12	12	10	6
MR	---	6	4	2	0	-2	-4
MC	1	1	1	1	1	1	1

Profit maximizing price = 4

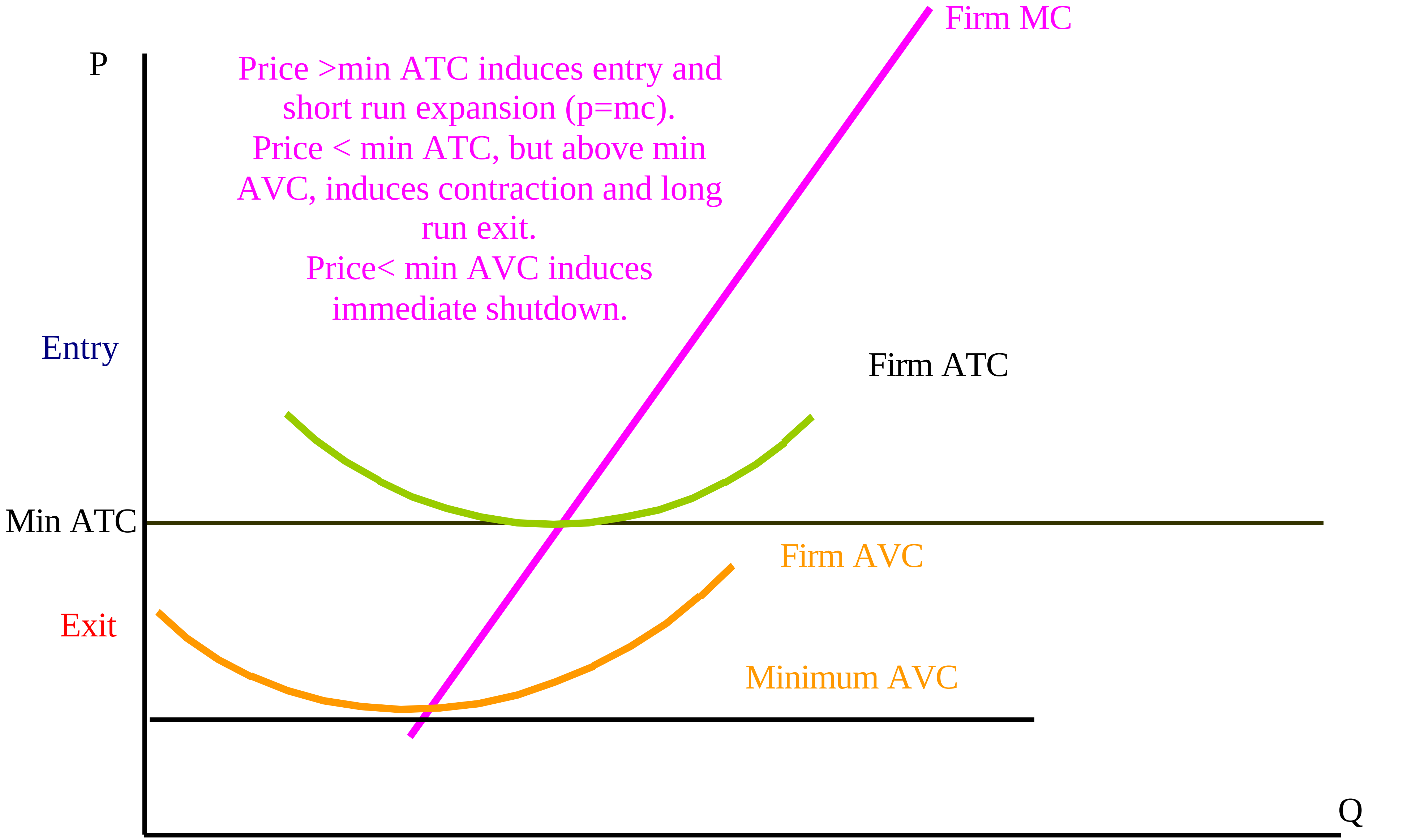
(10 points) "Taxes on goods with inelastic demand are less distortionary than taxes on goods with elastic demand." How does the elasticity of demand affect the deadweight loss associated with taxes for a competitive industry?

As the demand gets more inelastic, the quantity change for a given tax is reduced, therefore reducing the deadweight loss. In the extreme case of perfectly inelastic demand, there is no deadweight loss.

(15 points) Bagels have grown significantly in popularity. Viewing bagel production as a competitive industry, trace out the short and long run effects (on quantity, price, the number of suppliers and supplier's profits) of this demand increase. You will need two diagrams, one for the market and one for the firm.

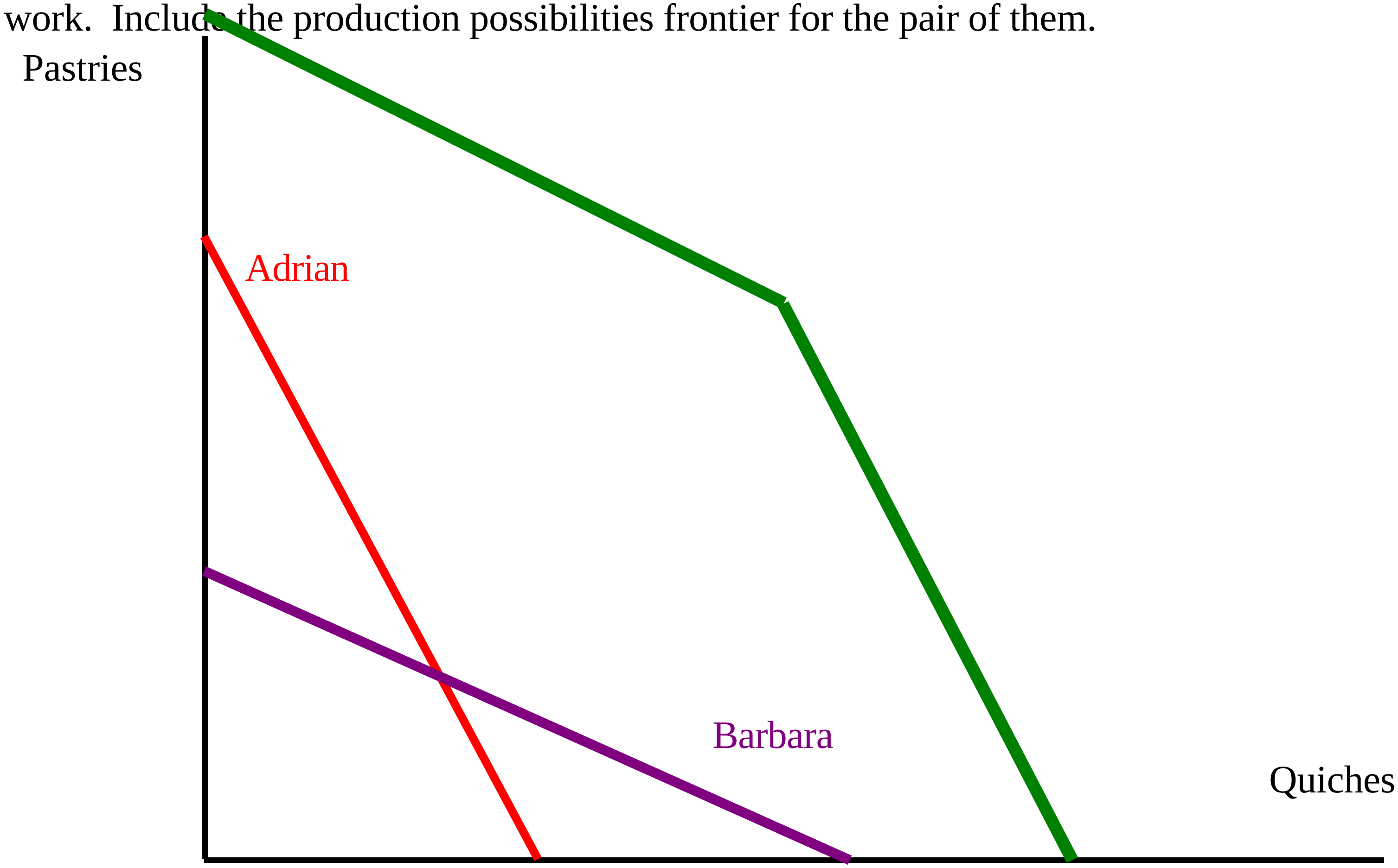


P
Initial
Demand
New
Demand
Initial
SRS=MC
After Entry
SRS=MC
Short
Run
LRAC=LRS
Entry shifts out
Short run supply
Q


Firm MC
P
Price >min ATC induces entry and short run expansion (p=mc).
Price < min ATC, but above min AVC, induces contraction and long run exit.
Price< min AVC induces immediate shutdown.
Entry
Firm ATC
Min ATC
Firm AVC
Exit
Minimum AVC
Q

16. (6 points) Adrian and Barbara are having a dinner party. Adrian can make two pastries per hour, and one quiche per hour. Barbara can make one pastry per hour, and two quiches per hour.

(i) Draw and label Adrian's and Barbara's production possibilities frontiers if they have one hour to work. Include the production possibilities frontier for the pair of them.



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

Adrian gives up fewer quiches per pastry. Neither has an absolute advantage, because Barbara can make more quiches and Adrian can make more pastries.

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

First, use Adrian for pastries because he is cheaper, and Barbara for quiches. Barbara can make 6 quiches in 3 hours, at which point Adrian has made 6 pastries. The quiches are done, so then put both on pastries, producing 3 pastries per hour (two for Adrian and one for Barbara), so an additional two hours is needed to complete the order, or 5 hours total.

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

(ii)	Bob		
Ann		Left	Right
	Up	(5,5)	(0,0)
	Down	(4,4)	(6,6)

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

(iv)	Bob		
Ann		Left	Right
	Up	(7,2)	(9,9)
	Down	(4,4)	(8,7)

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

(ii)	Bob		
Ann		Left	Right
	Up	(5,5)	(0,0)
	Down	(4,4)	(6,6)

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

(iv)	Bob		
Ann		Left	Right
	Up	(7,2)	(9,9)
	Down	(4,4)	(8,7)

For the following two games, compute the mixed strategy equilibria. What is the probability that Bob plays Right and the probability that Ann plays Up?

(i)	Bob		
Ann		Left	Right
	Up	(0,3)	(3,0)
	Down	(1,3)	(1,4)

(i) Probability that
Ann plays Up: 1/4
Bob plays Left: 2/3

(i)	Bob			
Ann		Left q	Right 1-q	
	Prob p Up	(0,3)	(3,0)	0q+3(1-q)
	(1-p) Down	(1,3)	(1,4)	1
		3	0p+4(1-p)	

1=3(1-q), or q=2/3.

3 = 4(1-p) or p=1/4.

(Short answer, 3 points) Ann and Bob play a game, and there is a mixed strategy equilibrium. Ann currently computes her winnings in Canadian dollars. If instead she computes her winnings in US dollars, will the mixed strategy equilibrium change? Explain briefly.

The effect of changing the payoffs from Canadian dollars to US dollars is to rescale all Ann's payoffs by a positive constant. In the mixed strategy, which sets the expected payoff from one action equal to the expected payoff to the other, the exchange rate acts as a multiplicative constant on both sides, and therefore cancels out. Thus, the rescaling has no effect on the equilibrium probabilities.

(short answer, 3 points) What is the winner's curse? How is it affected by the number of bidders?

The bidder who most overestimates the value of the object wins the bidding. The effect is greater the more bidders there are.

(short answer, 3 points) Why are English auctions commonly used?

A major advantage of the English, or oral ascending, auction is the release of information and consequent reduction of risk associated with bidding aggressively. In addition, they are relatively fast and inexpensive to run.

Ernie and Burt are the only workers in a small furniture factory that makes tables. A table consists of a set of table legs and a table top. It takes Ernie 2 hours to make a set of table legs and 4 hours to make a table top. It takes Burt 1 hour to make a set of table legs and 1 hour to make a table top.

If Bert and Ernie work 8 hours per day, how do they maximize the number of complete tables produced? (Tables are sold with the legs unattached to the top.)

Ernie's cost of a table top is two sets of legs, while Burt's is one set of legs. Thus, Ernie has a comparative advantage at legs, while Burt has a comparative advantage at tops.

If we set Burt to making tops and Ernie to making legs, Burt makes 8 tops in a day, and Ernie makes 4 sets of legs. After 4 hours, Burt has made 4 sets of legs (matching Ernie's output). In the next four hours, if he divides his time, he makes two more tops and two more legs.

Together, they make 6 completed tables.

Suppose completed tables sell for $120. What price or prices implement the efficient solution? What are Bert and Ernie's wages?

The key insight is that Burt must divide his time between the two goods. Thus, to decentralize (use prices), Burt must make the same per hour from each one, and therefore the prices are equal.

Hence, tops and legs both sell for $60. Burt makes $60 per hour and Ernie makes $30 per hour.