

100 points total. Answer each question in the space provided. General advice: show your work, including any formulas or diagrams that you use in reasoning through your answers.

1. (12 pts.) Knowing what you do about the characteristics of different types of markets, briefly explain what type of market structure each of the following markets is:

a) Fast-food restaurants in Lexington

many small producers }
differentiated product } monopolistic
insignificant entry barriers } competition

b) Automobiles

small number of producers }
differentiated product } differentiated
significant entry barriers } oligopoly

c) Strawberry farming

many small producers }
homogeneous product } perfect
insignificant entry barriers } competition

d) UK basketball

only producer of a product }
for which there are no close } monopoly
substitutes

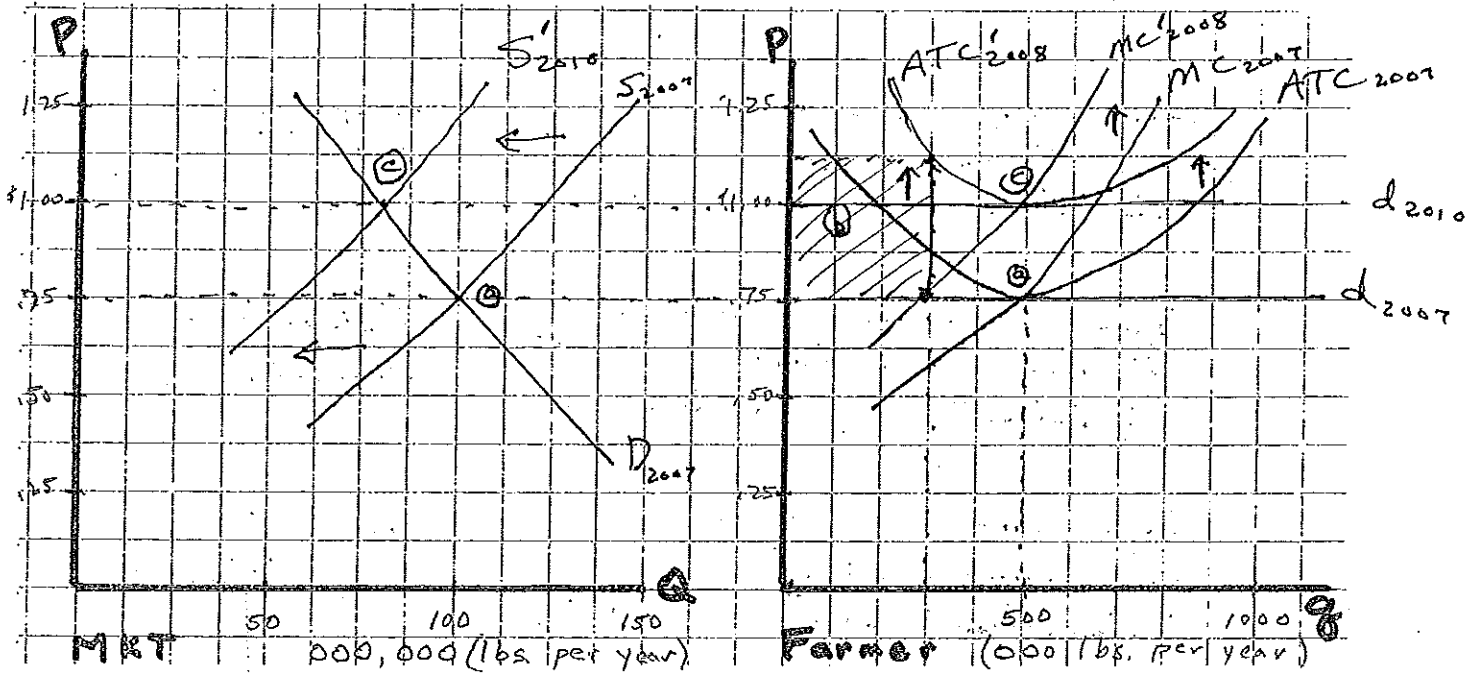
2. (6 pts.) Your parents own and operate a local jewelry store. They buy diamonds at wholesale and sell them at retail. At any point in time they will have some diamonds in inventory that they purchased last month and some that they purchased last year. In their current inventory they have a 1.00 carat diamond of a certain color, clarity, and cut which was purchased a year ago for \$2500. They have an identical diamond that was purchased a month ago for \$3000. To replace such a diamond in their inventory today they would have to pay the current wholesale price, which is \$2750. If the current retail market price for such a diamond is \$2900, how much economic profit would they make from selling the year-old diamond? The month-old diamond? Briefly explain your answer.

historical costs are sunk costs, and hence are irrelevant to current business decision-making. The economic margin or profit on either diamond is retail price minus current wholesale replacement cost:

$$\$2900 - \$2750 = \$150$$

3. (20 pts.) The year is 2007. The market for catfish is in long-run equilibrium, with the price of catfish equal to \$0.75 per pound. A typical catfish farmer produces 500,000 pounds of catfish per year, and the total U.S. production of catfish is 100,000,000 pounds per year.

(a) In the diagrams below, illustrate the initial situation and label it (a). Your diagrams should include market-level D and S curves and firm-level d , mc , and atc curves consistent with the above facts.



(b) For a variety of reasons, corn prices increase sharply. Since corn is a primary input in raising catfish, the cost of producing catfish rises by one third. Explain briefly below and illustrate the short-run effect on the costs and profits of catfish farmers in your diagram above.

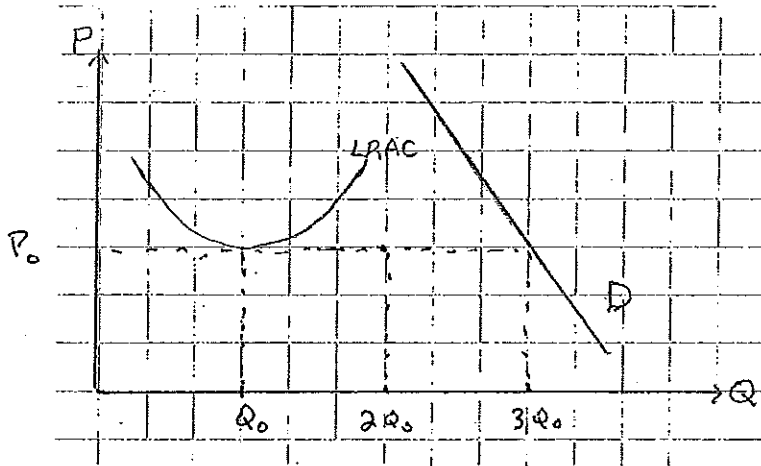
Costs rise by one-third, so ATC and MC curves shift upward to ATC' and MC' . In the short run, until the market price of catfish adjusts, farmers will suffer economic losses equal to the shaded area.

(c) Suppose that the increase in corn prices is permanent. Explain below and illustrate above what you think will occur in the catfish farming industry over time. Your answer should address what will happen to market price and output (Q), and to the output (q) and economic profitability of a typical farmer after the industry has reached a new long-run equilibrium.

Over time, ^{some} catfish farmers will go out of business, causing the market supply curve to shift left. When market price rises to \$1.00 per pound, the remaining catfish farmers will once again earn a normal return (zero economic profit).

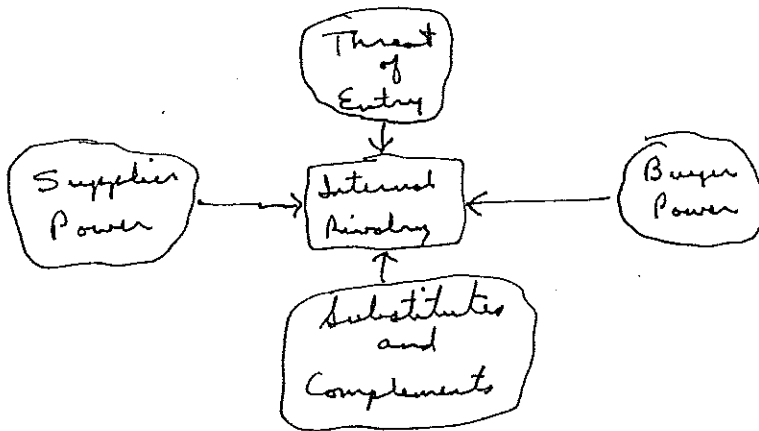
Yellow

4. (10 pts.) There are two bowling alleys in your hometown. Each is currently producing a rate of output equal to Q_0 . The long-run average cost curve for a typical bowling alley is illustrated below. The market demand curve for bowling in your hometown is labeled D in the diagram. Explain what you think is likely to happen over time in this market, using the diagram to explain why.



Since MC_S for bowling alleys is Q_0 , there is room in this market for three efficient-sized firms. Entry of another bowling alley is likely in the future.

5. (4 pts.) Using Porter's five forces model, briefly explain what popped the cork monopoly.



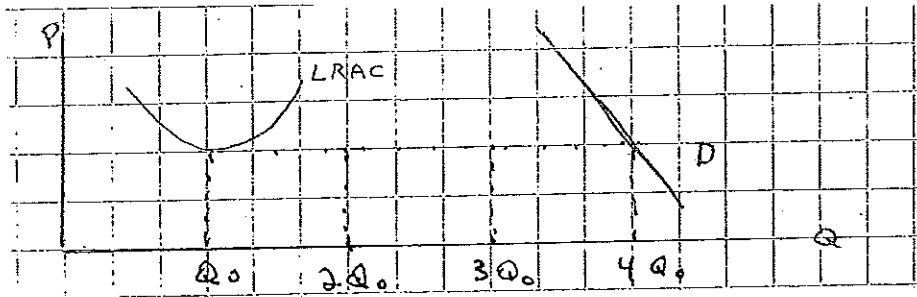
The development of plastic "corks", a substitute for natural corks, has greatly diminished the ability of the cork "cartel" to gouge winemakers on price.

6. (4 pts.) Who are the antagonists in each of "Techdom's Two Cold Wars"?

- (1) Microsoft and Google - operating systems and search engines
- (2) Google and Apple

Blue

4. (10 pts.) There are two bowling alleys in your hometown. Each is currently producing a rate of output equal to Q_0 . The long-run average cost curve for a typical bowling alley is illustrated below. The market demand curve for bowling in your hometown is labeled D in the diagram. Explain what you think is likely to happen over time in this market, using the diagram to explain why.



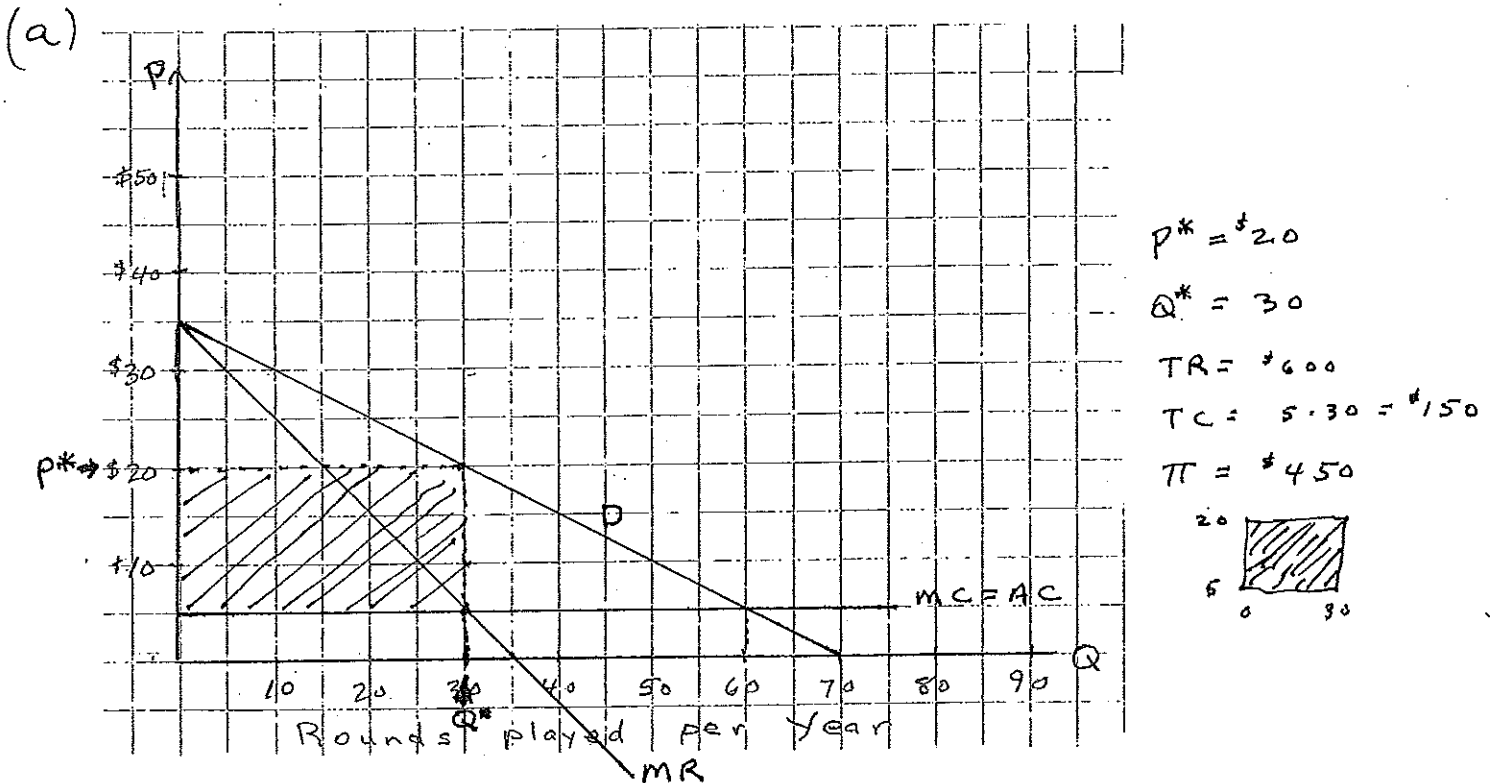
Since $MC = S$ for bowling is Q_0 , there is room in this market for four efficient-

sized firms. Entry of two more bowling alleys is likely in the future.

5. (4 pts.) Using Porter's five forces model, briefly explain what popped the cork monopoly.

6. (4 pts.) Who are the antagonists in each of "Techdom's Two Cold Wars"?

7. (20 pts.) Suppose that the mayor's sister is granted a monopoly charter by the Lexington city council to operate a Frisbee golf course. She can produce any level of output that she wishes at a constant marginal cost of \$5 per unit. Since she owns the only Frisbee golf course in town, anyone who wants to play must patronize her course. Assume that all Frisbee golfers are alike, and each one has an annual demand for playing that is given by $Q=70-2P$, where Q refers to the number of rounds played per year and P refers to price. Graph this demand curve below. What are the monopoly's profit-maximizing price and output? How much profit would she make off of each golfer in a year? A graphical answer is sufficient. Illustrate in the attached diagram.



The mayor's sister hires you as a consultant to help her be more creative in her pricing strategy. She senses that she is not extracting as much "surplus" as is possible out of each customer. (She got that idea from a bar that she patronizes where they charge an entry fee or cover charge and then a per unit price for each glass of beer.) She asks you to devise a two-part price that extracts as much surplus from each customer as is possible. The pricing structure would thus consist of an annual "membership fee" and a price for each round played during the year. What annual membership fee would you suggest that she charge and what price should she charge for each round played? You should refer to your diagram in answering this question.

- (b) Set price per round equal to marginal cost:
- $P = \$5$. The consumer would want to play 60 rounds per year at that price. They would receive consumer's surplus equal to the area of the triangle
-
- $= \frac{1}{2} \cdot 60 \cdot 30 = \900 .
- You could charge an entry fee of \$899.99, doubling your profits over (a).

Yellow

8. (8pts.) Boeing and Airbus each have three strategy options: (1) do nothing, (2) develop and build a medium to large fuel efficient jet, and (3) develop and build a super-jumbo jet. Boeing is the ~~row~~ ^{column} player and Airbus is the ~~column~~ ^{row} player in the payoff matrix below. The profit payoffs to each company are as indicated. What do you predict will be the outcome of this game? Explain the solution concept you use in solving this game:

Boeing

	Do nothing	Medium fuel-efficient jet	Super jumbo jet
Airbus Do nothing	1, <u>3</u>	2, 2	<u>4</u> , 2
Medium fuel-efficient jet	<u>4</u> , 0	4, 1	0, <u>3</u>
Super jumbo Jet	2, 5	<u>5</u> , <u>6</u>	3, 4

Neither firm has a ~~dominant~~ dominant strategy. There are no dominated or non-rationalizable strategies. But, if Boeing chooses to build a medium fuel-efficient jet and Airbus chooses to build a super jumbo jet, neither will experience ex post regret. That strategy pair is a Nash equilibrium to the game, because building a medium fuel-efficient jet is Boeing's best response to Airbus's decision to build a super jumbo jet, and building a super jumbo jet is Airbus's best response to Boeing's decision to build a medium fuel-efficient jet.

Blue

8. (8pts.) Boeing and Airbus each have three strategy options: (1) do nothing, (2) develop and build a medium to large fuel efficient jet, and (3) develop and build a super-jumbo jet. Boeing is the row player and Airbus is the column player in the payoff matrix below. The profit payoffs to each company are as indicated. What do you predict will be the outcome of this game? Explain the solution concept you use in solving this game:

Airbus

	Do nothing	Medium fuel-efficient jet	Super jumbo jet
Boeing Do nothing	1, 3	(4, 0) ↑	2, (5)
Medium fuel-efficient jet	2, 2	(4, 1) ↓	(5, 6)
Super jumbo Jet	(4, 2)	0, 3	3, (4)

Airbus has a dominant strategy - build a super jumbo jet. Knowing this, Boeing will choose its best response - build a medium fuel-efficient jet. This strategy pair is a Nash equilibrium, in that each player's chosen strategy is its best response to the strategy chosen by the other player. Neither experiences ex post regret.

9. (8 pts.) A rockslide closes state road KY 519 between Morehead and West Liberty, increasing the driving time from 30 minutes to over two hours. State highway engineers estimate that it will take two years to reopen the road. Understandably, the only two pizza restaurants in West Liberty are ecstatic. Guido's Restaurant, the column player below, has two strategy options: left (expensive deep-dish pizzas) or right (inexpensive thin-crust pizzas). Luigi, who lived in California for several years, has three strategy options at his diner: up (expensive deep-dish pizzas), middle (very expensive organic pizzas), or down (inexpensive thin-crust pizzas). Depending on their own strategy choice and that of their rival, the following payoff matrix describes the profitability of each strategy pair for the two restaurant owners:

		Guido's Restaurant	
		Left	Right
Luigi's Diner	Up	5, 6	10, 10
	Middle	6, 12	7, 2
	Down	8, 10	4, 12

When you visit West Liberty this fall to check out the cuisine, what menu strategy do you expect each restaurant to have chosen? Explain the solution concepts that you use in arriving at an answer.

Luigi will never choose middle, so we are left with a 2x2 payoff matrix:

	Left	Right
Up	5, 6	10, 10
Down	8, 10	4, 12

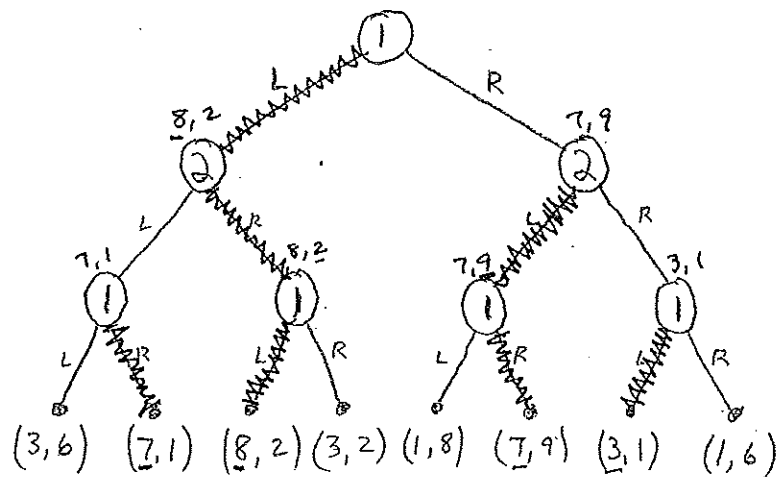
Guido has a dominant strategy of Right, and Luigi can expect him to play that.

Luigi's best response to Right is Up.

So when we visit West Liberty over Thanksgiving, we can expect to see Luigi's Diner to feature expensive deep-dish pizzas and Guido's Restaurant to feature inexpensive thin-crust pizzas.

yellow

10. (8 pts.) In the celebrations following the end of the business fundamentals segment of the daytime MBA program, one of your classmates (who has noticed that some of the revelers no longer seem to be thinking very clearly) devises the following sequential move game in an attempt to raise money to pay her next semester's tuition. She sells the right to be player one and to be player two to classmates who want to play the game. The payoffs below are in dollars, and represent the payoff to player one and to player two. What is the maximum amount you would pay to be player one? Player two? Explain the approach you use to solve the game and arrive at your answer.



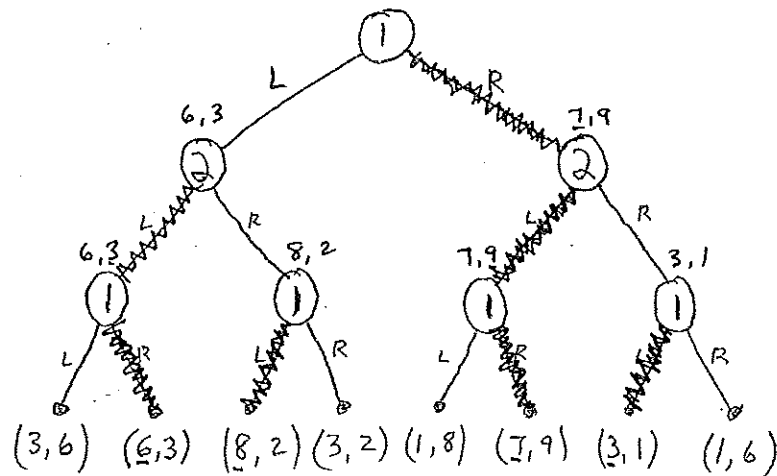
Using backward induction, i.e. looking ahead and reasoning backward, we can expect that player 1 will choose left, then player 2 will choose right, and finally player 1 will choose left. This outcome is subgame perfect Nash equilibrium, in other words, rational in all its subgames.

Since you can expect to win 3 if you are player 1 and 2 if you are player 2, these amounts represent the maximum you would pay to be player 1 and player 2.

[an additional question: Suppose your classmate is your opponent and her goal is to minimize the amount she pays off to you. How would that change the outcome of the game if she is player 1 and you are player 2? and vice versa?]

BLUE

10. (8 pts.) In the celebrations following the end of the business fundamentals segment of the daytime MBA program, one of your classmates (who has noticed that some of the revelers no longer seem to be thinking very clearly) devises the following sequential move game in an attempt to raise money to pay her next semester's tuition. She sells the right to be player one and to be player two to classmates who want to play the game. The payoffs below are in dollars, and represent the payoff to player one and to player two. What is the maximum amount you would pay to be player one? Player two? Explain the approach you use to solve the game and arrive at your answer.



Using backward induction, i.e. looking ahead and reasoning backward, we can expect that player 1 will choose right, then player 2 will choose left, and finally player 1 will choose right. This outcome is subgame perfect Nash equilibrium, in other words, rational in all its subgames. Since you can expect to win 7 if you are player 1 and 9 if you are player 2, these amounts represent the maximum you would pay to be player 1 and player 2.