

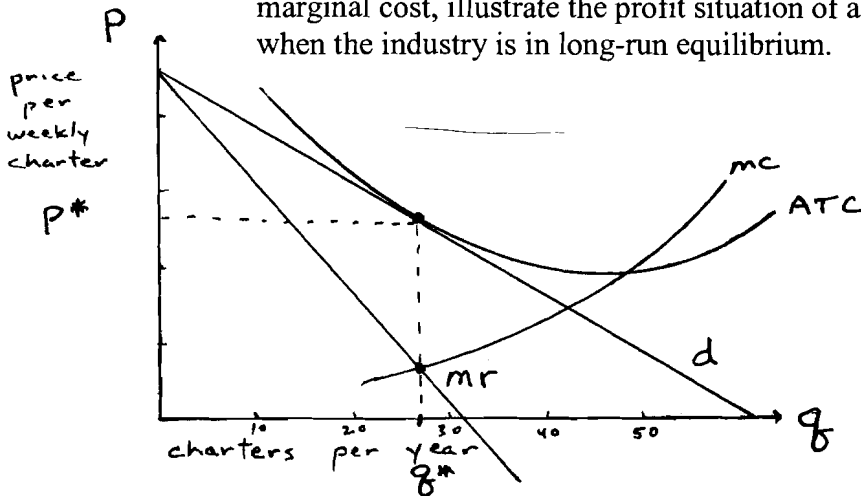
Questions 1-6: multiple choice, 4 points each, circle correct answer.

1. The four producers of glockenspiels have market shares of 40%, 30%, 20%, and 10%. The Herfindahl-Hirschman Index (HHI) for this industry is:
- D**
- a) 100 (0.01) c) 1500 (0.15)
b) 1000 (0.10) **d) 3000 (0.30)**
2. Between Gillette Mach III razor handles and razor blades we would expect to find a cross-price elasticity of demand equal to:
- D**
- a) 5.0 c) -0.5
b) 0.5 **d) -5.0**
3. Buyer power is likely to be a more important force in constraining the profitability of firms in an industry if:
- A**
- a) Buyers can easily integrate backwards (upstream).**
b) Buyers are atomistic.
c) Buyers have few substitutes for the product.
d) Sellers' products are highly differentiated.
4. Entrants are likely to be at a competitive disadvantage relative to incumbents in each of the following situations except
- A**
- a) There are learning curve effects where the information is a public rather than private good.**
b) Incumbents have developed strong brand loyalty among customers.
c) Buyers have locked into long-term contracts to purchase from existing sellers.
d) New firms must go through a complicated licensing process before becoming a supplier.
5. A critical strategic move in Cortez's military campaign against the Aztec Empire was:
- C**
- a) When he fired his cannon and sank the Aztec war canoes.
b) When he adopted trench warfare methods in the siege of the Aztec capital.
c) When he burned all but one of his ships after landing his troops on the beach.
d) When he charged his mounted cavalry into the Aztec warriors.
6. Price competition between rivals in an industry is expected to be softer if
- D**
- a) There are a few large buyers.
b) Firms have dissimilar costs.
c) Firms hold excess capacity.
d) Prices and terms of sales are publicly known.

7. (5 pts.) What is the key element in defining the product and geographic dimensions of a market?

Sensitivity to price. If Lexington Honda dealers raise their prices slightly, and consumers respond by traveling to Frankfort to check out prices there, then we would say that Lexington and Frankfort are in the same geographic market. Similar reasoning would apply to determining whether Toyota Camrys and Honda Accords are in the same product market.

8. (6 pts.) In a diagram with demand, marginal revenue, average total cost, and marginal cost, illustrate the profit situation of a typical Greek charter yacht owner when the industry is in long-run equilibrium.



Long-run equilibrium in a monopolistically competitive market is characterized by zero economic profits being earned by the typical firm.

9. (6 pts.) Give an example of each of the different types of price discrimination.

1st degree: automobile dealer who negotiates a separate price with each individual customer.

2nd degree: quantity discounts, such as those offered by cell phone suppliers.

3rd degree: market separation, such as airlines charging a lower price to passengers who are willing to stay over Saturday night.

10. (5 pts.) Explain how learning curve effects have enabled Airbus to behave as a top dog in the super-jumbo jet market.

Airbus moved more quickly than Boeing and is several years ahead in the development of a super-jumbo jet. As a result of learning curve effects, its production costs will be lower than Boeing's, enabling it to assert dominance in the market by underbidding Boeing for super-jet contracts.

11. (10 pts.) Southeast Airlines and Jet Green are the only two airlines flying between Paducah and Pikeville. Market demand is given by $P = 200 - Q$, where P is market price and Q is the total number of passengers flown by both airlines. Each firm has constant marginal costs of \$80 per passenger, and no fixed costs. The two firms behave as Cournot duopolists, i.e., they each take their rival's output as given and then select their own output to maximize their own profits. Explain what each firm's price, output, and profits will be.

Market demand: $P = 200 - Q_1 - Q_2$, where Q_1 and Q_2 represent the outputs of firms 1 and 2. Firm 1 maximizes profit by taking Q_2 as given and setting $MR = MC$:

$$TR_1 = PQ_1 = (200 - Q_1 - Q_2) Q_1 = 200 Q_1 - Q_1^2 - Q_1 Q_2,$$

$$MR_1 = 200 - 2Q_1 - Q_2, \text{ and setting } MR = MC: 200 - 2Q_1 - Q_2 = 80, \text{ or } Q_1 = 60 - Q_2/2.$$

By similar reasoning we can derive firm 2's profit-maximizing output choice, and we find symmetrically that $Q_2 = 60 - Q_1/2$.

Substituting for Q_2 in the Q_1 equation: $Q_1 = 60 - (60 - Q_1/2)/2 = 60 - 60/2 + Q_1/4$, so $3Q_1/4 = 30$, or $Q_1 = 40$.

Symmetrically, $Q_2 = 40$, and $P = 120$.

So each firm produces 40 units of output, which establishes a market price of 120. Each firm earns profit equal to $(P - MC)Q$, or 1600. (Note that when MC is constant, $MC = AC$).

Neither firm experiences ex post regret by producing those outputs, because each firm's output choice is optimal given the output produced by its rival. The other condition for market equilibrium is met, because the total output produced by both firms equals the total quantity demanded by consumers at the market price.

12. (5 pts.) Suppose that the two airlines merge and are able to behave as a monopolist in the Paducah-Pikeville market. Explain what their price, output, and profits will be.

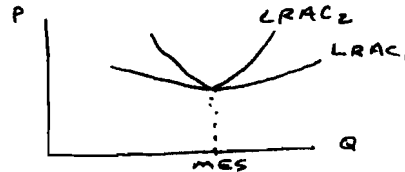
A monopolist will produce the output where $MR = MC$, and then set price according to market demand.

$$TR = PQ = (200 - Q)Q = 200Q - Q^2. \quad MR = dTR/dQ = 200 - 2Q.$$

Setting $MR = MC$: $200 - 2Q = 80$, or $Q = 60$, which implies that the profit-maximizing price is $P = 140$. Profit will be $(P - MC)Q = \underline{3600}$. So the merged airline behaving as a monopolist restricts output to drive up price, and increases overall profits derived from the market.

13. (5 pts.) Why is entry more likely if, for a given MES, the LRAC curve is a flat U-shape rather than a steep U-shape?

Small scale entry is more feasible if the LRAC curve is flatter because smaller firms are at a lesser cost disadvantage relative to larger firms.



14. (6 pts.) Briefly describe Frontier Airlines' strategy in its rivalry with United Airlines. What name would you apply to such a strategy?

Frontier Airlines has entered markets dominated by United on a small scale, and schedules its flights at times that do not conflict directly with United's. United has thus been confronted with the prospect of starting a price war over a small part of the market, and instead has accommodated Frontier's entry. Frontier thus has acted as a puppy dog, placating the top dog and enjoying the available scraps.

15. (6 pts.) One large pig and one small pig are placed in a box. At one end is a lever which when pressed causes a dispenser at the other end of the box to release ten units of food. The effort expended in pressing the lever costs each pig the energy equivalent of two units. If the small pig presses the lever, the big pig eats nine units of food and only one unit is left for the small pig, so the small pig receives a payoff of -1 units. If the big pig presses the lever, the small pig can consume four units of food by the time the big pig has crossed the box. If both pigs press the lever, the small pig can get to the food first, but can only consume three units of food by the time the big pig arrives and shoves it aside. If neither pig presses the lever, each gets zero. What will be the outcome of this game?

		Big Pig	
		<i>Press</i>	<i>Don't Press</i>
Small Pig	<i>Press</i>	0, 5	-1, 9
	<i>Don't Press</i>	4, 4	0, 0

The small pig is better off not pressing the lever, regardless of what the big pig does. Hence that is the small pig's dominant strategy. Given that the small pig doesn't press, the big pig is better off pressing the lever, which results in a payoff of 4 units of food for each pig.

16. (10 pts.) The following payoff matrix describes the strategies and payoffs in a simultaneous-move game. The row player has three different strategy choices, Top, Middle, or Bottom. The column player also has three different strategy choices, Left, Center, or Right. Using the concepts of dominant and dominated strategies and Nash equilibrium, explain what the outcome of this game will be.

		Column Player		
		Left	Center	Right
Row Player	Top	1, 1	2, 0	1, 1
	Middle	0, 0	0, 1	0, 0
	Bottom	2, 1	1, 0	2, 2

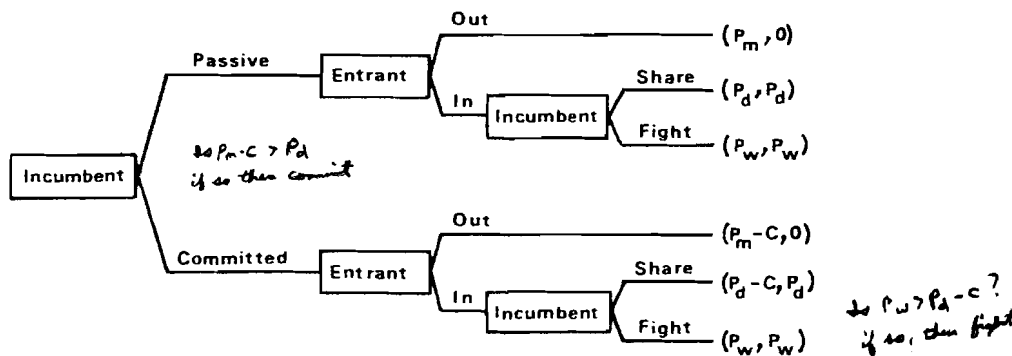
Middle is a dominated strategy for the row player, so she will never play Middle. The column player, knowing the row player to be rational and knowing that she will never play Middle, now has a dominated strategy, Center. So he will never play Center. With the 2 x 2 payoff matrix that is left, the row player has a dominant strategy.

		Column Player	
		Left	Right
Row Player	Top	1, 1	1, 1
	Bottom	2, 1	2, 2

Bottom is the better strategy for her, regardless of the strategy choice of the column player. So she will play bottom. The column player, knowing her dominant strategy, will choose his strategy to maximize his own payoff. So he will play right. The strategy pair (Bottom, Right) is a Nash equilibrium, because given that the column player plays Right, the row player is best off playing Bottom. Given that the row player plays Bottom, the column player is best off playing Right. Neither player experiences ex post regret.

17. (12 pts.) An incumbent monopolist earns economic profits, the present discounted value of which are Π_m . Another firm is considering entering the monopolist's market. If the monopolist reacts to entry by initiating a price war, both the monopolist and the entrant would suffer losses of Π_w . If the monopolist accommodates entry and shares the market, both would earn duopoly profits of Π_d . The monopolist has the option of undertaking an irreversible action right now in preparation to fight a price war if entry does in fact occur. This undertaking would cost C dollars and would reduce the monopolist's return by that amount if a price war is not fought, but would not affect the monopolist's return if a price war is fought.

- a) Suppose $\Pi_m = \$20$, $\Pi_d = \$10$, $\Pi_w = -\$1$, and $C = \$12$. Should the monopolist commit? If it were to commit, would its threat to fight a price war be credible? What will be the outcome of the game?
- b) Suppose $\Pi_m = \$24$, $\Pi_d = \$10$, $\Pi_w = -\$4$, and $C = \$12$. Should the monopolist commit? If it were to commit, would its threat to fight a price war be credible? What will be the outcome of the game?



- (a) If $\Pi_m - C < \Pi_d$, then don't commit. Since $20 - 12 < 10$, don't commit.
 If $\Pi_w < \Pi_d - C$, then threat to fight a price war is not credible. Since $-1 > 10 - 12$, fighting a price would be a credible threat.

Since both conditions are not met, the outcome of the game will be that the incumbent monopolist will not commit, entry will occur, and the incumbent monopolist will accommodate entry.

- (b) If $\Pi_m - C < \Pi_d$, then don't commit. Since $24 - 12 > 10$, commit.
 If $\Pi_w < \Pi_d - C$, then threat to fight a price war is not credible. Since $-4 < 10 - 12$, fighting a price would not be a credible threat.

Since both conditions are not met, the outcome of the game will be that the incumbent monopolist will not commit, entry will occur, and the incumbent monopolist will accommodate entry.