

**PRINCIPLES OF MICROECONOMICS (ECON 1101 SECTION 056)**  
**ASSIGNMENT #4**  
**Answer Key**

1. (20 points) Read the following articles. (Ask a reference librarian or the instructor if you need help accessing the articles.)

- Crenshaw, Albert B. “Visa, MasterCard Lose Supreme Court Appeal.” (2004, Oct. 5) *The Washington Post*. p. E5.
- Sidel, Robin and Wilkie, John. “Plastic Choices Apt to Stretch On Court Move.” (2004, Oct. 5) *The Wall Street Journal*. p. C1

- (a) Of what actions were Visa and MasterCard accused? Why were these actions anticompetitive?

Visa and MasterCard prohibited banks that issued their card from issuing cards from any other network. Such exclusive contracts prevent rivals and entrants from gaining market share.

- (b) What organization (or organizations) initiated legal action? Are they a federal regulatory agency, a state regulatory agency, or a private business?

The U.S. Justice Department brought the original suit. The Justice Department is a federal agency. Subsequent legal action was taken by Discover and American Express, both of which are private business.

- (c) Is the market structure for credit card networks better described as pure monopoly, oligopoly, monopolistic competition, or perfect competition? Why?

The market structure for credit card networks is best described as an oligopoly. A few firms offer a nearly undifferentiated product.

2. (40 points) Consider an industry where high entry costs prevent new firms from entering the industry. Suppose that market demand is described by  $P=600-2Q$ . Further suppose that fixed costs and marginal costs are both zero.

- (a) Suppose the industry has only one firm, which acts as a profit-maximizing monopolist. Calculate the monopoly price, quantity, and profits.

$$\begin{aligned} \text{Demand is } P &= 600 - 2Q, \text{ so } MR = 600 - 4Q \\ \text{Profit maximized by the } Q &\text{ where } MR = MC \\ 600 - 4Q &= 0 \\ 4Q &= 600 \\ \mathbf{Q} &= \mathbf{150} \end{aligned}$$

$$\begin{aligned} P &= 600 - 2(150) \\ \mathbf{P} &= \mathbf{300} \end{aligned}$$

$$\Pi = PQ - TC = 300(150) - 0 = \mathbf{45000}$$

(b) Now suppose the industry has two firms, which engage in Cournot quantity competition. Suppose each firm chooses between production quantities of 75 and 100. Provide the payoff matrix to this game.

When  $q_1=75$  and  $q_2=75$ :

$$\begin{aligned} Q &= q_1 + q_2 = 150 \\ P &= 600 - 2(150) \\ P &= 300 \end{aligned}$$

$$\begin{aligned} \Pi_1 &= Pq_1 - TC \\ \Pi_1 &= 300(75) - 0 \\ \Pi_1 &= 22500 \end{aligned}$$

$$\begin{aligned} \Pi_2 &= Pq_2 - TC \\ \Pi_2 &= 300(75) - 0 \\ \Pi_2 &= 22500 \end{aligned}$$

When  $q_1=100$  and  $q_2=75$ :

$$\begin{aligned} Q &= q_1 + q_2 = 175 \\ P &= 600 - 2(175) \\ P &= 250 \end{aligned}$$

$$\begin{aligned} \Pi_1 &= Pq_1 - TC \\ \Pi_1 &= 250(100) - 0 \\ \Pi_1 &= 25000 \end{aligned}$$

$$\begin{aligned} \Pi_2 &= Pq_2 - TC \\ \Pi_2 &= 250(75) - 0 \\ \Pi_2 &= 18750 \end{aligned}$$

By symmetry, when  $q_1=75$  and  $q_2=100$ :

$$\begin{aligned} \Pi_1 &= 18750 \\ \Pi_2 &= 25000 \end{aligned}$$

When  $q_1=100$  and  $q_2=100$ :

$$\begin{aligned} Q &= q_1 + q_2 = 200 \\ P &= 600 - 2(200) \\ P &= 200 \end{aligned}$$

$$\begin{aligned} \Pi_1 &= Pq_1 - TC \\ \Pi_1 &= 200(100) - 0 \\ \Pi_1 &= 20000 \end{aligned}$$

Likewise,  $\Pi_2=20000$

		Firm 2	
		q <sub>2</sub> =75	q <sub>2</sub> =100
Firm 1	q <sub>1</sub> =75	22500, 22500	18750, <u>25000</u>
	q <sub>1</sub> =100	<u>25000</u> , 18750	<u>20000</u> , <u>20000</u>

(c) Find the Nash equilibrium to the game in (b).

The only Nash equilibrium is (100, 100).

(d) An outcome in which the two firms arrange to produce the monopolist's quantity is a cartel. What strategies in (b) would a cartel choose? Are any of them Nash equilibria?

The outcome (75, 75) would produce the monopolist's quantity and is therefore a cartel outcome. It is not a Nash equilibrium.

3. (20 points) In the payoff matrix below, the numbers before commas are the discount store's profits and the numbers after commas are mainstream store's profits.

		Mainstream store		
		Lower prices	Aggressive marketing	Open new location
Discount Store	Raise quality	30, 90	<u>60</u> , <u>110</u>	50, 100
	Maintain prices	<u>40</u> , 100	50, 105	<u>55</u> , <u>110</u>

(a) Find all Nash equilibria.

The only pure strategy Nash equilibrium is (Raise quality, Aggressive marketing).

(b) Are there any dominate strategies? If so, list them.

No.

4. (20 points) The *Wall Street Journal* reported the following data on market share for light automobiles in the US in 2008. (In their presentation luxury brands were separated from their owners. Percentages do not add to 100, presumably from rounding error.)

Company	Market Share	MS Squared
General Motors	29.3	858.49
Toyota	15	225
Ford	12.1	146.41
Chrysler	11.1	123.21
Honda	10	100
Nissan	6.2	38.44
Volkswagen	4.1	16.81
Hyundai	2.6	6.76
Mercedes-Benz	1.9	3.61
BMW	1.9	3.61
Kia	1.8	3.24
Mazda	1.7	2.89
Subaru	1.5	2.25
Mitsubishi	0.8	0.64
Suzuki	0.4	0.16
Volvo	0.4	0.16
Tata	0.4	0.16
Porsche	0.2	0.04
Total		1531.88

(a) Calculate the four-firm concentration ratio.

$$C_4 = 29.3 + 15.0 + 12.1 + 11.4 = \mathbf{67.5}$$

(b) Calculate the Herfindahl-Hirschman Index. **1532**

(c) Compare the market concentration of automobiles to other industries.

The market concentration is less than that of the aircraft and breakfast cereal industries, but less concentrated than the boat building and stuffed toy industries.