NOVA SCHOOL OF BUSINESS & ECONOMICS

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Time: 2:00

INDUSTRIAL ORGANIZATION
(B.S. in Economics and B.S. in Management)

Midterm exam

Answer each question on a separate sheet of paper. Good luck!

1. [15 minutes; 4 points] The following statement was recently made by a former student of this course:

> "In general, the more firms there are competing against each other, the better for consumers. However, there are exceptions to this general economic 'rule'."

Comment in no more than ten lines (graphs, if any, excluded) while agreeing or disagreeing.

2. [15 minutes; 4 points] Jane Theory, the best student in her class, said:

> "A technological improvement may lead to a decrease in price or an increase in the Herfindahl-Hirschman index, but not both simultaneously."

Comment in no more than ten lines (graphs, if any, excluded) while agreeing or disagreeing.

3. [45 minutes; 6 points] Two firms, 1 and 2, compete in a market of an homogeneous good whose demand is $q = 10 - p$. Firm 1 does so at a constant marginal and average cost of 2 and has a capacity constraint of 1 physical unit. Firm 2 produces at a constant marginal and average cost of 3 and faces no capacity constraint. Firms compete in quantities which they set simultaneously and independently.

(i) Compute and draw each firm's best-reply function.

(ii) What quantity will each firm produce? What profit will each make? Quantify.

Firm 1 is considering installing new machinery that removes its capacity constraint while maintaining its marginal and average cost.

(iii) What is the maximum amount that firm 1 is willing to pay for the new machinery? Quantify.

(iv) Is the installation of the new machinery *necessarily* socially beneficial? Quantify and explain.

(v) Are there two externalities involved in the new technology adoption decision by firm 1? Is each of them positive or negative? Explain verbally.

4. [45 minutes; 6 points] Two firms sell products, denoted 1 and 2, whose demand functions are $q_1 = 10 - p_1 - p_2$ and $q_2 = 10 - p_2 - p_1$, respectively. Each produces its product at a constant marginal and average cost of 2, i.e., $c_1 = 2 = c_2$. They compete in prices, which they set simultaneously and independently.

(i) What is the relation between the two goods from the consumers' viewpoint? Justify.

(ii) What price will each firm set? How much will each sell? What profit will each attain? Quantify.

(iii) What is the relation between the two firms' decision variables from a strategic viewpoint? Justify.

(iv) Is there an externality between firms 1 and 2? Positive or negative? Explain.

Firm 1 has purchased firm 2.

(v) What prices will the firm set? How much will it sell of each good? What profit will it attain? Quantify.

(vi) Compare the prices found in (ii) with those in (v) bearing in mind the answer to (iv). Explain.