Econ 393
Test 1

Instructions: You need paper (lined if possible), a ruler and a pen or a pencil to write this test. You may answer the questions in any order you like. You should start each question on a new page. You must write your answers; typed answers will not be accepted. When you are finished answering the questions, please order the pages so your answers to question 1 are first, and then your answers to question 2, etc. Then, in a single email message, send an image of each page to me at jburbidg@uwaterloo.ca. Please put Econ 393, your name and your id number in the subject line of your email. The deadline for submitting your answers is 6:00 pm Tuesday June 9th, Toronto time. The marks allocated to each question are shown in brackets.

1. (two marks for each part) Consider a world with two goods, 1, 2, many type A’s, and an equal number of type B’s. Assume the endowments of each A are (17, 3) and each B are (3, 7), and assume that the utility function for either an A or a B is \( u(x_1, x_2) = x_1 x_2 \).

(i) As carefully as you can, draw the Edgeworth rectangle for this exchange economy (put good 1 is on the horizontal axis). Draw the A and B indifference curves that pass through the endowment point, and the A and B offer curves. Label the endowment point \( E \) and the competitive equilibrium \( C \).

(ii) In a new diagram, redraw the Edgeworth rectangle to illustrate the equilibrium in which the B’s have a monopsony in the good they are buying. Assume the B’s do not have the power to practice price discrimination. Label the equilibrium \( Y \) and label all the lines in your diagram.

(iii) In a third diagram, redraw the Edgeworth rectangle to illustrate the equilibrium in which the A’s have a monopoly in the good they are selling, and the A’s are able to practice perfect price discrimination. Label the equilibrium \( Z \) and label all the lines in your diagram.

2. Suppose a “town” comprises people uniformly distributed along a line 36 miles long, with 100 people per mile. Travel costs are 1 dollar per person per mile. There is one bowling alley located at mile 12 and another located at mile 24. All customers are willing to pay up to 15 dollars for a night of bowling. The mile-24 bowling alley is a little newer — the marginal cost of caring for a customer while at that bowling alley is 2 dollars. The marginal cost of caring for a customer at the mile-12 bowling alley is 4 dollars. Ignore the fixed costs of each bowling alley — set them equal to zero.
(3 marks) (i) Assume the bowling alleys pay transport costs for their customers, and each bowling alley acts to maximize its profits. As carefully as you can, draw: (i) a graph of price against location; (ii) a graph of profit against location; and (iii) a graph of consumer’s surplus against location.

(3 marks) (ii) Describe all the Pareto efficient allocations in this economy. Is the equilibrium in (i) Pareto efficient?

3. The Federation of Quebec Maple Syrup Producers is a government-sanctioned monopoly that regulates the production and marketing of maple syrup in Quebec. Let’s build a very simple model of maple syrup production and marketing. Suppose all producers are identical. Each has the capability to produce up to, but no more than, 10000 cans of syrup each year. For each producer marginal cost is constant at 4 dollars per can and average cost is 6 dollars per can when production is 10000 cans per year. Suppose the inverse market demand is

\[ p = 12 - \frac{Y}{1000000}, \]

where \( Y \) is the total number of cans sold in the market.

(3 marks) (i) As carefully as you can, draw the competitive equilibrium diagrams that correspond to Figure (i) in the web site file Assignment 1 pictures. In your “producer” picture make sure you label the axes, and marginal cost, and average cost. Show market demand, market supply, producers’ surplus and consumers’ surplus in your “market” picture.

(3 marks) (ii) Now draw the diagrams that correspond to Figure (ii) in Assignment 1 pictures — monopoly with no price discrimination. In this equilibrium assume the output for every producer, that is, the quota set by the Federation, is the same.

(2 marks) (iii) Does the individual producer have an incentive to exceed its quota and sell some cans outside the Federation? Defend your answer.

4. True, false and explain (2 marks each).

(i) A profit-maximizing monopolist will pass an increase in the profits tax rate onto consumers in higher prices.

(ii) Mergers always reduce consumers’ surplus.