

due : Wednesday November 26 before class

Do all 5 questions. Each counts 20%.

1. Suppose that the aggregate demand curve by men for some good has the equation

$$Q^M = \frac{100}{p^2}$$

where Q^M is the aggregate quantity demanded by men, and p the price they pay. The aggregate demand curve of women, for the same product, is

$$Q^W = \frac{100}{p^3}$$

where Q^W is the aggregate quantity demanded by women.

A monopoly is able to supply the good at a constant marginal cost of $MC = 1$ (in unlimited quantities). Compare the price paid by men, and the price paid by women in the following two situations :

- (i) The monopoly can charge different prices to men and women (who are not able to resell the good).
- (ii) The monopoly must charge the same price to all buyers.

2. In a duopoly, suppose that each firm has the same production technology : if they pay a fixed cost of $F > 0$, they can produce as much output as they wish, at a marginal cost of zero. (So the total cost of producing $q > 0$ units is a constant F , whereas the cost of producing nothing is zero.)

If the market demand curve has the equation

$$Q^d = B - p$$

what are the equilibria if the firms behave as Cournot duopolists, choosing quantities simultaneously and non-cooperatively?

3. Another model of duopoly is that of **von Stackelberg**, in which firms choose output levels **sequentially**. That is, firm 1 chooses its output **first**, and cannot change its output after it has made its choice. Firm 2 then observes what output level firm 1 has chosen, and then chooses its own output level. What output levels would the 2 firms choose, if they behaved in this manner, if the demand and technology were as in question #2 above, with $F = 10$ and $B = 12$?

4. What does the contract curve look like for a 2–person, 2–good exchange economy, with a total endowment of A units of good 1 and B units of good 2, if the preferences of the two people could be represented by the utility functions

$$u^1(x_1^1, x_2^1) = (x_1^1)^3(x_2^1)^6$$

$$u^2(x_1^2, x_2^2) = (x_1^2)^4(x_2^2)^2$$

where x_j^i is person i 's consumption of good j ?

5. What are the allocations in the core of the following 3–person, 2–good economy?

Person 1 regards the two goods as **perfect substitutes**.

Person 2 and person 3 regard the two goods as **perfect complements**.

The endowments of the three people are $\mathbf{e}^1 = (3, 0)$, $\mathbf{e}^2 = (3, 0)$, $\mathbf{e}^3 = (0, 6)$.