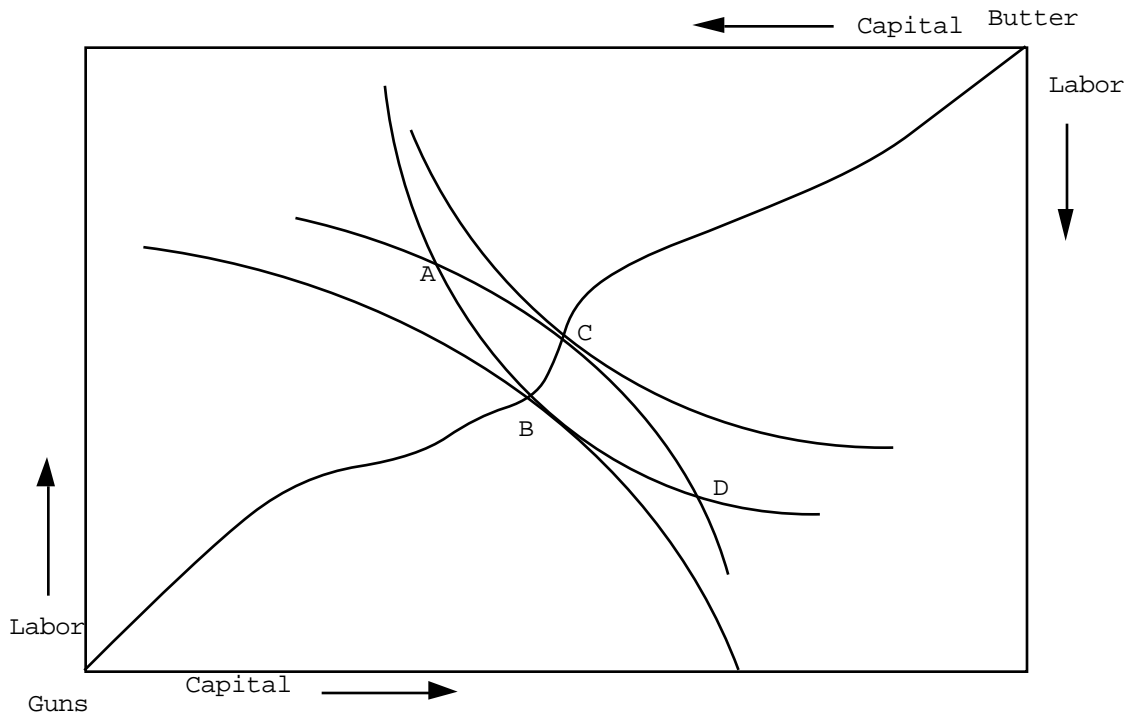


Final

Instructions. There are six problems on the exam. The first four problems are in multiple choice format. Each of these problems is worth 25 points. There are 5 questions per problem, 5 points per question. For each multiple choice question, write the letter that corresponds to the correct answer in the booklet. The fifth and sixth problems are in essay format. You must supply all the diagrams needed to answer these questions. Make sure your discussion is sufficient for me to understand your reasoning. Good luck.

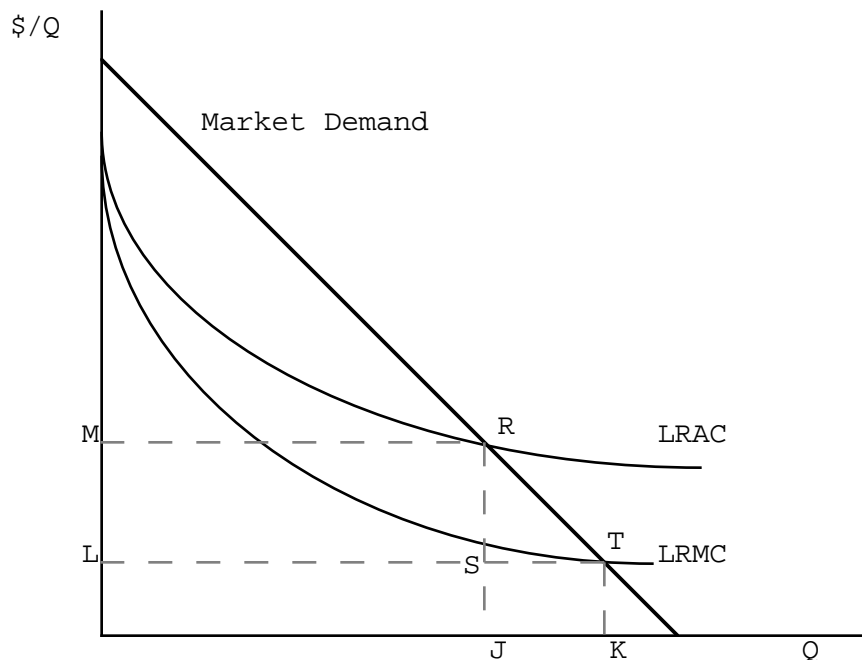
Grades (both for the final and the course) should be available Tuesday afternoon, May 10, outside my office, 452 Commerce West. You can also get an answer sheet to the final at that time.

Problem I. This problem concerns the efficient allocation of two inputs, Capital and Labor, across the two output sectors of society, Guns and Butter. The following diagram is referred to extensively in this problem.



1. Along the arc labelled ABD
 - a) The production of Guns is held constant.
 - b) The production of Butter is held constant.
 - c) The Pareto Ranking of the allocation is held constant.
 - d) The Rate of Technical Substitution for Guns is held constant.

2. Among the points indicated in the diagram, those that lie on the contract curve are
- A only.
 - A and D.
 - B only.
 - B and C.
3. Suppose that the initial allocation of capital and labor across the two sectors is given by point A. Then
- The resulting output of Guns and Butter is on the Production Possibilities Frontier of this economy.
 - This allocation is Pareto Optimal.
 - This allocation can be supported with competitive prices.
 - The economy can produce more Guns and more Butter.
4. Suppose that the initial allocation of capital and labor across the two sectors is given by point A. Then the set of Core allocations is given by
- The contract curve.
 - The arc ABD.
 - The arc ACD.
 - The curve BC.
5. Suppose that the initial allocation of capital and labor across the two sectors is given by point B. Then
- The resulting output of Guns and Butter is inside the Production Possibilities Frontier in this economy.
 - The Rate of Technical Substitution is the same in both sectors.
 - This allocation can not be supported with competitive prices.
 - The economy can produce more Guns and more Butter.
- Problem II.** This problem is concerned with regulation of natural monopoly. The diagram on page 3 is referred to extensively in this problem.
6. In the industry characterized in the diagram:
- There are constant returns to scale.
 - There are increasing returns to scale.
 - There are decreasing returns to scale.
 - The Law of Diminishing Returns does not hold.
7. The output that maximizes social surplus is given by point:
- J.
 - K.
 - L.
 - M.
8. If a regulator wanted to maximize social surplus but was constrained to ensure a fair rate of return for the firm, the regulator would set price at:
- J.
 - K.
 - L.
 - M.



9. If a regulator wanted to maximize social surplus and could make up losses the firm might incur with a lump sum transfer out of general tax revenues, the regulator would set price at:

- J.
- K.
- L.
- M.

10. The "Dead-Weight Loss" that results when the regulator cannot make lump sum transfers out of general tax revenues is indicated by:

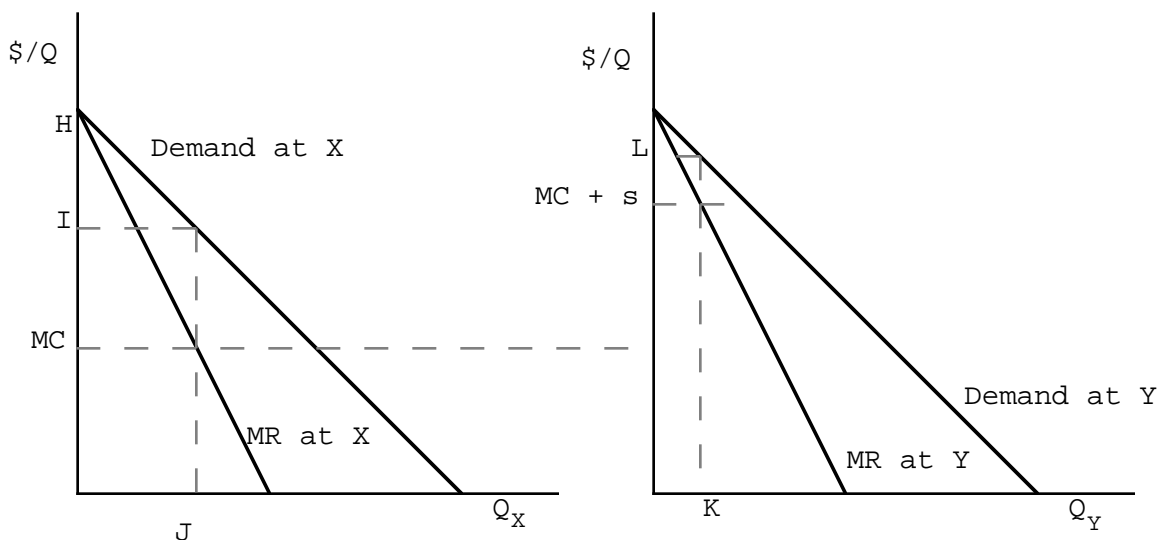
- The area of the rectangle MLSR.
- The area of the region MLTR.
- The area of the triangle RST.
- The height of the segment RS.

Problem III. Suppose a monopolist operates its plant at location X and sells its product in two spatially separated markets. The first market is located near the plant at location X while the second market is some distance from the plant at location Y. Assume that the market demand curves at both locations are identical and are given by:

$$P_X = A - BQ_X \quad \text{and} \quad P_Y = A - BQ_Y,$$

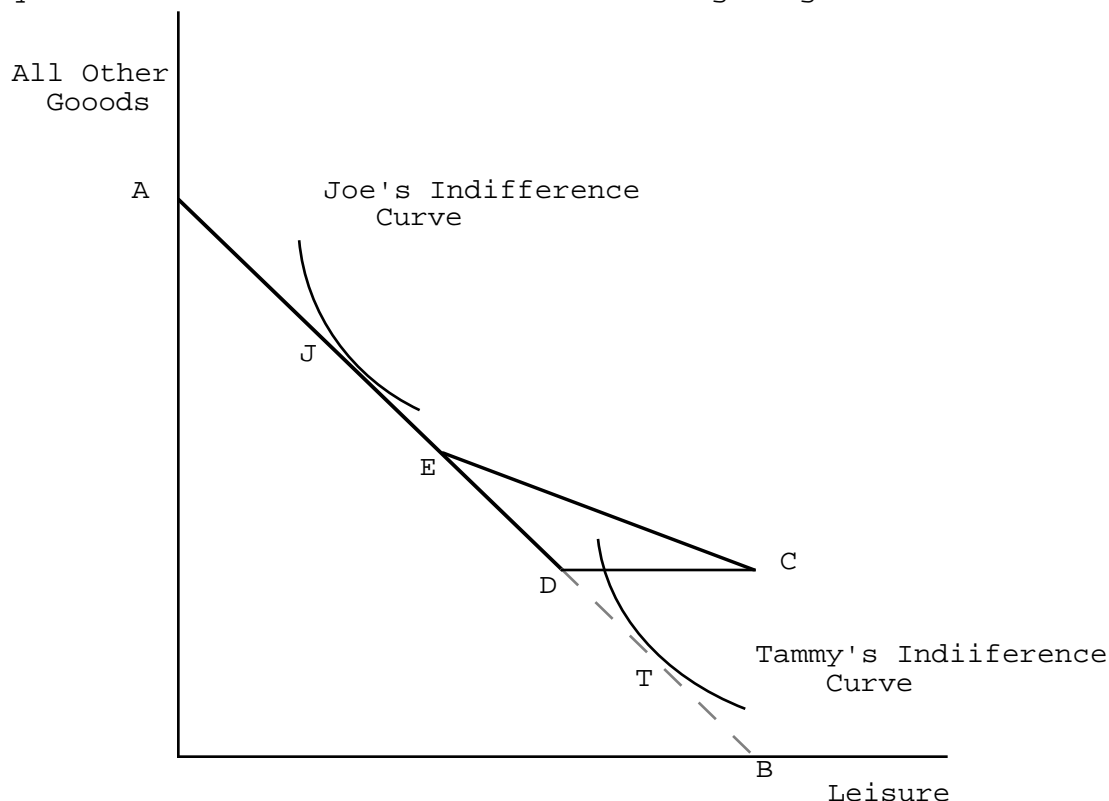
where P_X and P_Y are the prices in markets X and Y respectively while Q_X and Q_Y are the quantities sold in markets X and Y respectively.

Suppose that average production cost does not vary with output. Finally, assume that there is no transportation cost involved in selling product at location X but assume that the firm must pay a freight cost of s for each unit of output delivered to the market at location Y. This set-up is depicted in the diagram on the next page.



11. If the monopolist has an exclusive contract with the supplier of transportation services, the prices charged are:
- I in both markets.
 - L in both markets.
 - The average of I and L in both markets.
 - I in market X and L in market Y.
12. In this case, the price differential between the two markets is:
- s.
 - 2s.
 - $s/2$.
 - 0.
13. Considering the markup of price over marginal cost (inclusive of delivery costs) in the two markets, it is evident that
- There is no price discrimination here.
 - There is price discrimination, in favor of the buyers at Y.
 - There is price discrimination, in favor of the buyers at X.
 - Buyers at Y are shut out of the market.
14. Suppose the buyers of the product can also contract with the supplier of transportation services.
- This forces the price differential between the two markets to be s.
 - This means that all buyers pay I. Buyers in market Y must also pay the freight charge.
 - This means that buyers in market X will get a price discount.
 - There is no difference to the case where the monopolist has an exclusive contract with the supplier of transportation services.
15. Now suppose that the government requires all buyers of the product to arrange for transportation of the product from the plant. That is, all output that is sold is sold at location X.
- Buyers at Y are shut out if the length of segment HI is greater than s.
 - The price at location X rises if buyers at Y are shut out.
 - The price at location X stays unchanged if buyers at Y are not shut out.
 - The price at location X falls if buyers at Y are not shut out.

Problem IV. This question concerns AFDC and the Negative Income Tax as alternative means for providing income support to the working poor. The questions make reference to the following diagram.



16. The budget line under the AFDC program is given by
 - a) The segment AB.
 - b) The segment BD.
 - c) The segment AE and the segment EC.
 - d) The segment AD and the segment DC.
17. Compared to the case where there is no government assistance,
 - a) Joe increases his labor supply under AFDC.
 - b) Joe decreases his labor supply if J is preferred to C.
 - c) Joe is made worse off by AFDC.
 - d) Joe chooses point C under AFDC if C is preferred to J.
18. In considering the incentives of the two programs on Tammy.
 - a) There is no difference between the programs.
 - b) Tammy works more under AFDC than under the Negative Income Tax.
 - c) Tammy works more under the Negative Income Tax than in the absence of any government assistance if Leisure is normal.
 - d) Tammy might be encourage to work part time under the Negative Income Tax while she definitely would not work at all under AFDC.
19. Suppose that Joes greatly outnumber Tammys in the population and that Joes prefer J to C. Then the effect of AFDC compared to the case of no government interference is to make
 - a) Aggregate labor supply decrease mildly.
 - b) Aggregate labor supply increase.
 - c) Aggregate labor supply decrease dramatically.
 - d) Aggregate labor supply is not affected by AFDC.

20. Suppose that Tammys greatly outnumber Joes in the population and that Tammys' most preferred point on the segment EC differs from C. Then the effect of AFDC compared to the case of the Negative Income Tax is to make

- a) Aggregate labor supply decrease more dramatically.
- b) Aggregate labor supply increase.
- c) Aggregate labor supply decrease less dramatically.
- d) Aggregate labor supply is the same under both programs.

Problem V. Consider a market where the inverse demand curve is:

$$P(Q) = 70 - Q,$$

where Q denotes the industry output. Suppose the cost function for firm 1 is given by:

$$C_1(Q_1) = 10Q_1$$

and the cost function for firm 2 is given by:

$$C_2(Q_2) = 10Q_2.$$

- a) What is firm 1's marginal cost? Firm 2's?
- b) Suppose firm 1 were a monopolist in this market. How much would firm 1 produce in this case? What price does it charge?
- c) Now suppose the market is characterized by Cournot duopoly. Find the equilibrium firm outputs, industry output and price.

Problem VI. Each firm in a perfectly competitive industry requires 1 acre of land to locate its plant. Land rent per acre is \$1000/year. Suppose that in the current long run competitive equilibrium, each operating firm in the industry produces 100 units of output.

Now suppose that due to an increase in the demand for agricultural products, land rent per acre rises to \$2000/year.

- a) What is the effect of this input price increase on marginal cost, *in the short run*? How does the product price respond to this increase in input price, *in the short run*?
- b) What is the effect on minimum *long run* average cost from this input price increase? Can you put a bound on how much minimum average cost changes?
- c) What is the effect on *long run* marginal cost?
- d) What is the effect on the firm's efficient scale?
- e) How does the product price change in the long run?
- f) What happens to the number of firms in the industry? Is there entry or exit?