Sample Final Exam Answers
(Summary: Prepared for TA Grading Purposes)

1. Short Questions

(1a) Palm Pilots. It will not be profitable in one period: the SR income effect on demand is 8% growth.

It will become profitable in the longer term: the LR effect is .8/.25 = 3.2, or 32% growth.

Advanced answer (unnecessary): You get 14% growth in two periods, and so you need 3 periods to break even.

(1b) FPLDD. Need 1. Agreement, 2. Monitoring and 3. Enforcement. Remarks could easily base an agreement. Trade association idea facilitates monitoring. What is missing is any notion of enforcement. Would need host company to be very large, traditional price leader capable of flooding market.

(1c) By the Dorfman-Steiner Theorem, advertising expenditures as a percentage of revenue are equal to the ratio of advertising elasticity to price elasticity. One would expect price elasticity to be lower for the Mercedes. It is more of a luxury good and has few competitors. Because advertising elasticity is the same Mercedes price elasticity is lower, we would expect more advertising for the Mercedes

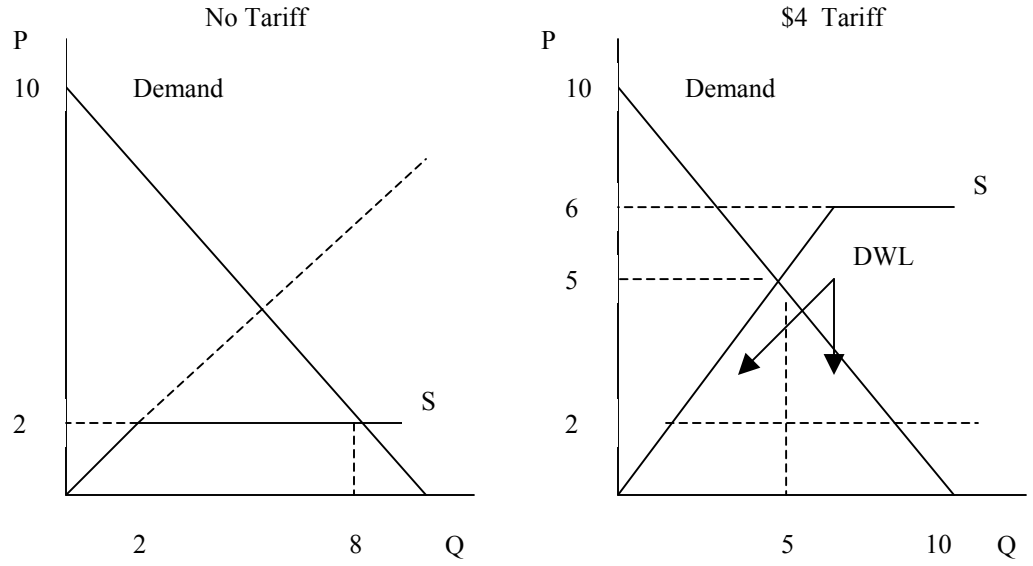
2. Soybeans

(2a) P = \$2, Q= 8, CS = ½(8*8) = 32, PS = ½(2*2) = 2

(2b) With the given demand curve, the tariff shuts out the world market, as U.S. demand can be satisfied at costs under \$6.

P=\$5, Q=5, CS = ½(5*5) = 12.5, PS = ½(5*5) = 12.5

(2c) Since no units are imported with the tariff, government revenue from the tariff is 0, deadweight loss is TScompetitive – TS w/tariff = 34-25=9. See graph below:



(2d) First, the tariff results in a productive inefficiency – units are produced in the U.S. for more than $2 – these units could be obtained cheaper overseas. Second, there is a consumption inefficiency – there are consumers in the U.S. who are willing to pay between $5 and $2 for soybeans. With the tariff, these consumers do not buy.

3. Advertising

Firms choose advertising levels to maximize profits. Profits for firm 1 are:

$\text{Profit1} = Q_1*(5-4) - A_1^2$

$= (10 + A_1 - A_2 + A_1A_2) - A_1^2$

Differentiating w.r.t. A_1 and setting the result equal to zero gives:

$0 = 1 + A_2 - 2A_1$

or the "reaction function": $A_1 = (1+A_2)/2$

The analogous calculation for firm 2 gives: $A_2 = (1+A_1)/2$

Solving the reaction functions simultaneously, we get

$A_1 = A_2 = 1$

4. Two-Market Monopolist

(4a) With two separate geographic markets, we can serve the two demands separately, charging different prices.

For **Market #1**, $TR_1 = P_1Q_1$, and the inverse demand function can be written as $P_1 = 15 - Q_1$. Substituting P_1 into TR_1 gives

$$TR_1 = 15Q_1 – 1/2Q_1^2$$

Taking the derivative with respect to Q_1 gives us the marginal revenue for Market #1

$$MR_1 = 15 – Q_1$$

Since $TC = 5 + 2(Q_1 + Q_2)$, taking the derivative with respect to Q_1 gives us the marginal cost for Market 1:

$$MC_1 = 2$$

We know that monopolists price such that MR = MC, so set $MR_1 = MC_1$:

$$15 – Q_1 = 2 \text{ or } Q_1 = 13 \text{ units.}$$

Substituting Q_1 back into the inverse demand function gives the price

$$P_1 = 15 – 1/2Q_1 = \$8.5$$

We can use the same process for **Market #2** to derive Q_2 and P_2.

$$Q_2 = 11 \text{ units and } P_2 = \$13.$$

The profit function is $\pi = P_1Q_1 + P_2Q_2 – TC$, and we can substitute the values of P_1, Q_1, P_2, and Q_2 into the equation to calculate profits:

$$\pi = (13)(8.5) + (11)(13) – [5 + 2(11 + 13)] = \$200.5$$

(4b) With open borders price cannot vary between the two market. First, sum the demands of the two markets: $Q = Q_1 + Q_2$

$$Q = 54 – 3P$$

For the whole market, TR = PQ. The inverse demand function can be written as

$$P = 18 – Q/3.$$

Substituting this value for P into TR gives

$$TR = 18Q – 1/3Q^2$$

Taking the derivative with respect to Q gives us the marginal revenue for the market

$$MR = 18 – 2/3Q$$

We know that MC = 2, and that monopolists price such that MR = MC, so

$$18 – 2/3Q = 2$$

Solving for Q gives us Q =24 units, and substituting Q back into the inverse demand function gives the price, P = \$10. The profit is $\pi = (10)(24) – [5 + 2(24)] = \$187$.

5. Running Shoes

(5a) Net revenue from producing shoes is

$$PQ - TCS = 20Q - 1.5\,Q^2 - 5\,Q = 15Q - 1.5\,Q^2$$

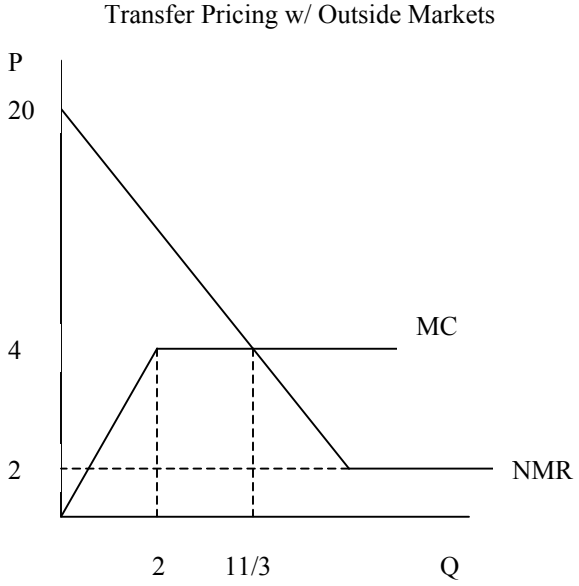
Therefore NMR = 15 – 3 Q. We set NMR = MC for leather. MC = 2Q, so

$15 - 3Q = 2Q$, giving $Q = 3$.

The transfer price is p = MC = 2(3) = 6.

(5b) Perfect outside market, so we set transfer price p = 3. For production, p = MC implies Q = 1.5 (thousand units) are produced inside. For shoes, p = NMR implies Q = 4 (thousand pairs) are produced. Therefore 4 – 1.5 = 2.5 (thousand units) are bought in the outside market.

(5c) Buying price is 4, selling price is 2. To obtain leather, produce inside until MC = 4, then buy outside. To process leather, process until NMR = 2, and then sell outside. From picture, see that effective NMR=MC (including market use) at P = 4. From p = MC, produce Q=2 (thousand units), and from p = NMR, produced 11/3 (thousand pairs of) shoes are produced. Therefore, 11/3 – 2 = 5/3 (thousand units) are bought in the outside market and transported to your facility.



6. Al's Squash Club

(6a) Al should set the per-hour price equal to marginal cost ($1) and the tariff to equal consumer surplus at that price (0.5*8*4) = $16. Profits in this case are equal to 100*$16 = $1600.

(6b) There is no deadweight loss associated with the tariff. Since the marginal price equals marginal cost, the right number of hours is purchased. With a single price, this is the standard monopoly problem and there will be deadweight loss.

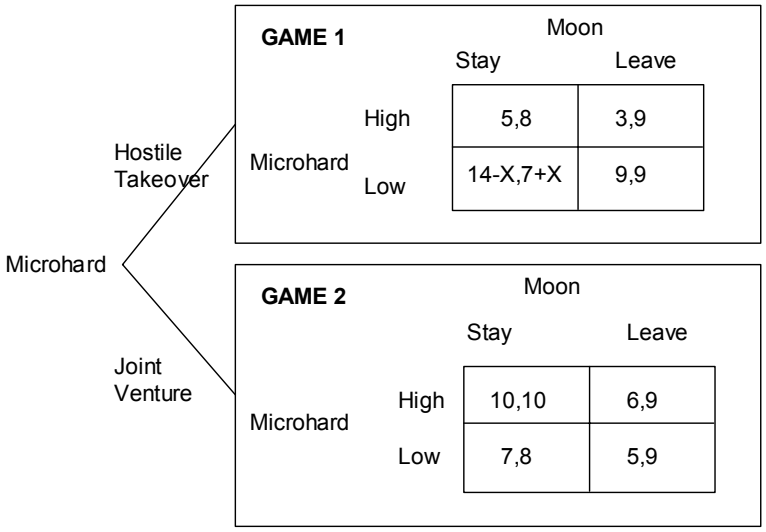
7. Microhard

(7a) Moon does have a dominant stragey in GAME 1. Whatever Microhard does, Moon is better off to play LEAVE. Similarly, Microhard has a dominant strategy in GAME 1. Whatever Moon does, Microhard is better off playing LOW. The Nash equilibrium of the game is therefore (LOW,LEAVE)

(7b) In GAME 2, Moon does not have a dominant strategy. If Microhard plays HIGH, then Moon's best strategy is to STAY, whereas if Microhard plays LOW, Moon's best strategy is to LEAVE. In contrast, Microhard does have a dominant strategy. Whatever Moon plays, Microhard is better off playing HIGH. The Nash equilibrium of GAME 2 is (HIGH, STAY).

(7c) If Microhard decides upon a hostile takeover, it receives a payoff of 9 in the equilibrium of game 1 while it receives 10 in the equilibrium of GAME 2. Thus, Microhard should decide to undertake a joint venture.

(7d) Now we make (LOW,STAY) become (14-X,7+X). In order to induce Moon's employees to stay, we need to give them at least 9. Thus X must be some number at least two, but below 4. (Strictly, the question asks for the minimum, so X=2.00001) Suppose X=3. In that case, the game becomes



and the Nash equilibrium in GAME 1 is (LOW,STAY). In that case, Microhard's payoff is 11 from undertaking the hostile takeover and 10 from the Joint Venture. Microhard should choose the hostile takeover. At the minimum, X=2.000…01 and Microhard's payoff is slightly less than 12 in the new equilibrium.

8. Fishing

(8a) Villagers will take up fishing up to the point where the individual income from doing so just balance the opportunity cost of leaving their weaving jobs. This is at the point where average catch income = \$40:

$\$1[(200X - 2X^2)/X = 40$

$X = 80$

Daily income from fishing is then $\$1(200 - 2*80) = \$40$

Total income of the 100 villagers is the sum of income from weaving and fishing:

Income = 20*40 + 80*40 = \$4000

(8b) A village council will set the marginal fish revenue from an additional person fishing (MFI) equal to the cost to the village (i.e., the lost weavers wage):

$MFI = \$1(200 - 4X) = 40$

$X = 40$

Daily income from fishing is then $\$1(200 - 2*40) = \$120$

Total income of the 100 villagers again is the sum of income from weaving and fishing:

Income = 60*40 + 40*120 = \$7200

9. T, F, U

(9a) UNCERTAIN. The average cost in Pittsfield is lower, but the relevant cost for deciding where to shift the new order is the MARGINAL cost. The MC might be higher or lower in Pittsfield than in North Adams; the question doesn't give any way to tell.

(9b) FALSE. Descending auctions with risk averse bidders give the seller higher expected revenue since they make the highest value bidder jump in earlier to avoid the risk of losing the object.

(9c) See Problem Set 6 Solutions