Econ 301
Deiter
R In Class #14 (10 pts.)
F'09

Name Key

A. Assume Fuji has estimated the Japanese market demand and U.S. market demand for its film. More specifically:

P_U	=	$9 - .5Q_U$
MR_U	=	$9 - Q_U$
P_J	=	$15 - Q_J$
MR_J	=	$15 - 2Q_J$
MC	=	ATC = AVC = 3 (same for all markets)
TFC	=	0 (for simplicity)

Where MR	=	marginal revenue
U	=	the U.S. market
J	=	the Japanese market
MC	=	marginal cost (also = avg. variable costs)
TFC	=	total fixed costs
P	=	price

Use this information to answer questions #1-#7 below.

1. Solve for Fuji's inverse demand functions in Japan and in the U.S.

$P_U = 9 - .5Q_U \Rightarrow .5Q_U = 9 - P_U \Rightarrow Q_U = 18 - 2P_U$

$P_J = 15 - Q_J \Rightarrow Q_J = 15 - P_J$

2. Solve for Fuji's combined or total market demand = Q_T if the company charges a price = P_T in both Japan and the U.S. (i.e. Q_T as a function of P_T).

$$Q_U = 18 - 2P_T$$
$$+ \; Q_J = 15 - P_T$$
$$\Rightarrow Q_T = 33 - 3P_T$$

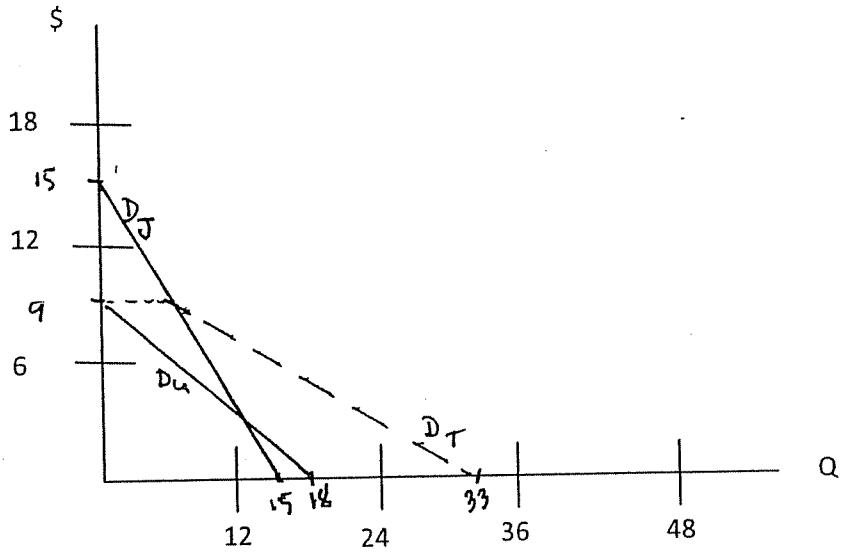
3. Given your answer to #2, solve for the inverse D equation (P_T as a function of Q_T) and solve for MR_T as a function of Q_T.

$Q_T = 33 - 3P_T \Rightarrow 3P_T = 33 - Q_T$

$\Rightarrow P_T = 11 - \frac{1}{3}Q_T$

$\Rightarrow MR_T = 11 - \frac{2}{3}Q_T$ same v. axis intercept, 2x the slope

4. Draw all three demand curves for Fuji in the graph below.



5. For what P_T price range would Fuji sell film in only one market? Which market is this?

If $P_T > 9 \Rightarrow$ sell only in Japan and $P_T < 15$

6. If Fuji does not 'price discriminate' in the 2 markets, what quantity of film should Fuji produce to maximize profits in the 'total' market and what maximum price could Fuji receive for the profit-maximizing quantity of film? What is maximum attainable profit for Fuji in both markets combined if it does NOT price discriminate?

π max $\Rightarrow MR_T = MC$

$\Rightarrow 11 - \frac{2}{3}Q_T = 3$

$\Rightarrow \frac{2}{3}Q_T = 8$

$\Rightarrow Q_T = 12$

$\Rightarrow P_T = 11 - \frac{1}{3}Q_T$

$= 11 - \frac{1}{3}(12)$

$\Rightarrow P_T = 11 - 4 = 7$

Max $\pi = (P - ATC)Q_T$

$= (7-3)(12)$

$\Rightarrow \pi = 48$

7. Assume Fuji does practice price discrimination in these two markets. In this case, what price should the company charge customers in Japan and in the U.S.? What is maximum attainable profit for Fuji in both markets combined if it DOES price discriminate?

Japan: $MR_J = MC$

$\Rightarrow 15 - 2Q_J = 3$

$\Rightarrow 2Q_J = 12$

$\Rightarrow Q_J = 6$

$\Rightarrow P_J = 15 - Q_J = 9$

U.S. $MR_U = MC$

$\Rightarrow 9 - Q_U = 3$

$\Rightarrow Q_U = 6$

$\Rightarrow P_U = 9 - .5Q_U$

$= 9 - (.5)6 = 6$

Max π =

$= (P_J - ATC)Q_J + (P_U - ATC)Q_U$

$= (9-3)(6) + (6-3)(6)$

$= 36 + 18$

$= 54 =$ max π

B. Assume the manager of Electro Tronics has provided you with the following information:

P	=	output price = 100 - q_T
q_T	=	total output (=$q_1 + q_2$)
q_1	=	output from plant #1
q_2	=	output from plant #2
TC_1	=	200 + 2 $(q_1)^2$
TC_2	=	400 + $(q_2)^2$

$\Rightarrow MR = 100 - 2q_T$

$= 100 - 2(q_1 + q_2)$

Use this information to answer questions #8 - #10 below.

8. For this firm, what is the level of q_1 and q_2 for maximizing profits?

#1: $MR = MC_1$

$\Rightarrow 100 - 2(q_1 + q_2) = 4q_1$

$\Rightarrow 2q_2 = 100 - 6q_1 \Rightarrow q_2 = 50 - 3q_1$

plug into 2nd π max condition

$\Rightarrow MR = MC_2$

$\Rightarrow 100 - 2(q_1 + q_2) = 2q_2$

$\Rightarrow 100 - 2q_1 - 2(50 - 3q_1) = 2(50 - 3q_1)$

$\Rightarrow 10q_1 = 100$

$\Rightarrow q_1 = 10$

$\Rightarrow q_2 = 50 - 3q_1$

$= 20$

9. What is the profit for this firm if $q_1 = 10$ and $q_2 = 20$? If $q_1 = 20$ and $q_2 = 10$?

$\pi(q_1 = 10, q_2 = 20)$

$= PQ_T - TC_1 - TC_2$

$= (100-30)(30) - [200 + 2(10)^2] - [400 + (20)^2]$

$= 2100 - 400 - 800 = 900$

$\pi(q_1 = 20, q_2 = 10)$

$= (100-30)(30) - [200 + 2(20)^2] - [400 + (10)^2]$

$= 2100 - 1000 - 500 = 600$

10. Suppose instead of the above, plant costs are as follows:

$TC_1 = 200 + 4q_1$

$TC_2 = 400 + 2q_2$

How much output would you recommend this firm produce from each of these plants in the short run if the firm wants to produce 30 units of output in total?

$\Rightarrow MC_1 = 4$, $MC_2 = 2$

$\Rightarrow$ produce ALL $q = 30$ out of plant 2 due to its constant, lower MC.