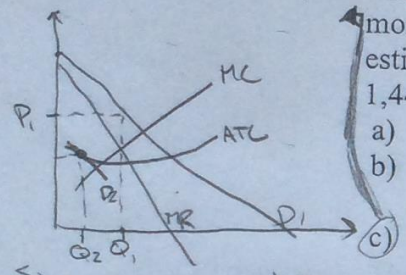
Concordia University
Faculty of Commerce and Administration
Department of Finance
Managerial Economics MBA 606/1 AA
Final Examination

Professor: Dr. B. Somers

June 27, 2003
7:00-10:00 pm

N.B. Crib sheets and any electronic devices capable of storing, transmitting, or receiving answers are strictly prohibited.

(20 marks) 1. Fine Threads, a manufacturer of men's suits, operates in a monopolistically competitive industry. The demand for its product is estimated by $P = 900 - 0.03Q_d$ and its total cost function is $TC = 1{,}440{,}000 + 300Q + 0.01Q^2$



a) Calculate the profit-maximizing price, output, and profit.
b) Using graph paper, plot the relevant functions to illustrate the profit-maximizing price and output.
c) If there is complete freedom of entry into the industry, what would happen in the long-run? Assuming a parallel shift in the demand curve (i.e. the high-price/low-output result):
   i) Find the equation for the new demand curve.
   ii) Calculate the new profit-maximizing price and quantity.
   iii) Illustrate the new profit-maximizing price and quantity in your diagram.

(20 marks) 2. Sophie's Coiffure is a chain of beauty salons. Recently management decided to practice price discrimination whereby it would charge a lower price to seniors. The following are estimates of the demand for permanents:

$P = 90 - 0.008Q_d$ (regular customers)
$P = 60 - 0.008Q_d$ (seniors)

The total cost function is $TC = 125{,}000 + 12Q + 0.0016Q^2$.

a) Find the profit-maximizing price and output for each market and total profit.
b) Using graph paper, illustrate how price and output is determined for each market.
c) Calculate the profit-maximizing price, output, and profit if management does not practice price discrimination.

(20 marks) 3. Addison Aluminum Inc. and Bachmann Enterprises Inc. are aluminum manufacturers. After lengthy negotiations, management at both companies have agreed to form a cartel and fix the price of aluminum. The demand for aluminum is estimated by the equation $P = 1{,}900 - 0.50Q_d$, where P is the price per ton and Q is in thousands of tons. The total cost curves of the two firms are as follows:

$TC_a = 150{,}000 + 500Q + 0.5Q^2$ $MC_A = 500 + Q$ $Q = MC_A - 500$

$TC_b = 200{,}000 + 500Q + 0.66Q^2$ $MC_B = 500 + 0.66Q$ $Q = \frac{3}{2}(MC_t - 500)$

Same thing for MRs in Price discrimination.

$\frac{1}{3}$ $Q = 2, SMC - 1250$

$MC = \frac{Q + 1250}{2.5}$

a) What is the equation for ΣMC?

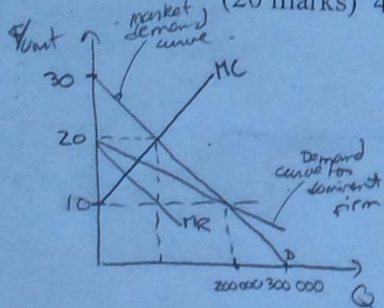
b) Calculate algebraically the profit-maximizing price and output for the cartel. π_{max} after $\Sigma MC = MR$ solve for Q, find P, find $\Sigma MC(Q)$

c) Using graph paper, illustrate diagrammatically the profit-maximizing price and output for the cartel.

d) Calculate the output and profit for each firm. Set $MC_a = \Sigma MC(Q_{\pi max})$ solve for Q_a.

Set $MC_b = \Sigma MC(Q_{\pi max})$ solve for Q_b.

P537



(20 marks) 4. The Brewer's Best Beer Company is the dominant firm and price leader in its industry. Its marginal cost is $MC_L = 11 + 0.0002Q$. The market demand for a case of 24 bottles is $P = 30 - 0.0001Q_d$ and the combined marginal cost of other firms in the industry is $MC_F = 10 + 0.0001Q$.

a) Find the demand equation for the dominant firm. equate MC to demand curve

b) Calculate the profit-maximizing price and output for the dominant firm and the other firms. Solve where they intersect

c) Using graph paper, illustrate diagrammatically the profit-maximizing price and outputs. then find MR & equate MR=MC

Dominant firm establish price, followers accept it if P over 10, followers would produce

(20 marks) 5. Discuss the following topics:

2 a) the relation between price elasticity of demand and markup pricing

1 b) long-run average cost economies of scale

1 c) the marginal rate of technical substitution*

2 d) the short-run supply curve of a perfectly competitive firm*

* A diagram is required.

$Q_L = 30\,000$

$P_L = 18,5$

$Q_F = 85\,000$

130

220

#4 for followers $P = MC$

find Q_f

$Q_L = Q_T - Q_f$.

$Q_f \Rightarrow$ Let $p = MC$, solve for Q_f

$Q_t \Rightarrow$ from demand function

$Q_L = Q_t - Q_f$

Concordia University
Faculty of Commerce and Administration
Department of Finance
Managerial Economics MBA 606/2 AA
Final Examination

Professor: Dr. B. Somers

December 15, 2003
6:00 – 9:00 pm

N.B. Crib sheets and any electronic devices capable of storing, transmitting, or receiving answers are strictly prohibited.

(20 marks) 1. Fanciful Fashions, a manufacturer of women's dresses, operates in a monopolistically competitive industry. The demand for its product is estimated by $P = 1{,}000 - 0.05Q_d$ and its total cost function is $TC = 500{,}000 + 600Q$.

a) Calculate the profit-maximizing price, output, and profit.
b) Using graph paper, plot the relevant functions to illustrate the profit-maximizing price and output.
c) Calculate the point price elasticity of demand at the profit-maximizing price and output and use this figure to calculate the optimal markup on cost.

(20 marks) 2. The Alpine Inn is located in Vermont near the Quebec border. After a comprehensive market study, management has decided to practice price discrimination by accepting the Canadian dollar at par with the US dollar and thereby charge a lower price to Canadian residents. The following are estimates of the demand for rooms at the inn:

$P = 250 - 0.01Q_d$ (Canadian residents)
$P = 350 - 0.01Q_d$ (US residents)

where P is the daily rate for a room in US dollars.

The total cost function is $TC = 1{,}000{,}000 + 40Q + 0.0002Q^2$.

a) Find the profit-maximizing price and output for each market and the total profit
b) Using graph paper, illustrate how price and output is determined for each market.
c) Calculate the profit-maximizing price, output, and profit if management does not practice price discrimination.

Exam ⇒ Demnd & Supply w/subsidy w/ DWL and P & Q

End of chapter problems

(20 marks) 3. A1 Video and Box Office Hits are video rental companies whose owners have decided to form a cartel and fix the price of a video rental. The demand for video rentals is estimated by the equation $P = 6 - 0.01Q_d$ where Q is in millions. The total cost curves of the two firms are as follows:

$$TC_a = 150 + 0.50Q + 0.02Q^2$$
$$TC_b = 90 + 1.50Q + 0.02Q^2$$

a) What is the equation for ΣMC?
b) Calculate algebraically the profit-maximizing price and output for the cartel.
c) Using graph paper, illustrate diagrammatically the profit-maximizing price and output for the cartel.
d) Calculate the output and profit for each firm.

(20 marks) 4. Acme Tree Service cuts down trees for residents of a large city. A secondary source of income for the company is the sale of the by-product as firewood. The two commodities are jointly produced in fixed proportions. The demand curves for these two products are as follows:

$P = 800 - 0.50Q_d$ (tree-cutting)
$P = 350 - 0.25Q_d$ (firewood)

Q_d, not $Q_a + Q_b$.

The total cost function is $TC = 300{,}000 + 130Q + 0.10Q^2$

If MR = ∅ Step producing sub product

a) Derive the equation for the total marginal revenue curve (MR_t).
b) Calculate the profit-maximizing price and output for each product and the total profit.
c) Using graph paper, illustrate the profit-maximizing price and output for each product.

(20 marks) 5. Discuss the following topics:
a) long-run average cost curve*
b) five determinants of price elasticity of demand
c) the kinked demand curve as an explanation of an oligopolist's behaviour*
d) the use of market experiments to estimate the demand for a product

* A diagram is required.

Concordia University
Faculty of Commerce and Administration
Department of Finance
Managerial Economics MBA 606/1 CA
Final Examination

Professor: Dr. B. Somers

August 19, 2004
6:00-9:00 pm

N.B. Crib sheets and any electronic devices capable of storing, transmitting, or receiving answers are strictly prohibited.

(20 marks) 1. Woolrich, a manufacturer of women's sweaters, operates in a monopolistically competitive industry. The demand for its product is estimated by $P = 800 - 0.002Q_d$ and its total cost function is $TC = 6{,}400{,}000 + 400Q + 0.002Q^2$

a) Calculate the profit-maximizing price, output, and profit.
b) Using graph paper, plot the relevant functions to illustrate the profit-maximizing price and output.
c) If there is complete freedom of entry into the industry, what would happen in the long-run? Assuming a parallel shift in the demand curve (i.e. the high-price/low-output result):
   i) Find the equation for the new demand curve.
   ii) Calculate the new profit-maximizing price and quantity.
   iii) Illustrate the new profit-maximizing price and quantity in your diagram.

(20 marks) 2. Hennessey and Legault is a law firm whose management has decided to practice price discrimination whereby it would charge a lower price to low-income clients. The following are estimates of the demand for their service:

$P = 600 - 0.002Qd$ (regular clients)
$P = 400 - 0.008Qd$ (low-income clients)
where Q is the number of hours

The total cost function is $TC = 4{,}500{,}000 + 10Q + 0.0009Q^2$.

a) Find the profit-maximizing price and output for each market and total profit.
b) Using graph paper, illustrate how price and output is determined for each market.
c) Calculate the profit-maximizing price, output, and profit if the law firm does not practice price discrimination.

(20 marks) 3. The Cedars Golf and Country Club's management has estimated the demand for golf games by a typical member to be $P = 260 - 2Q_d$, where P is the price of a single round of golf and Q is the number of games per year. The marginal cost is constant and equal to 60.

a) Calculate the profit-maximizing price and quantity for a typical member.
b) Using graph paper, illustrate the profit-maximizing price and quantity.
c) Now suppose management is able to implement a two-part pricing scheme whereby it would charge a single-unit price plus a fixed fee equal to the consumers' surplus received by each member at this price. Calculate the new profit-maximizing price, quantity, and fixed fee and illustrate these values in the diagram drawn for part b).

MC=D Q=100 P=100

$\frac{200 \times 100}{2}$

(20 marks) 4. Avro Air is the dominant firm and price leader in the market for business jets. Its marginal cost is $MC_L = 18 + 0.04Q$. The market demand for business jets is $P = 85 - 0.50Q_d$ where P is in millions of dollars. The combined marginal cost of other firms is $MC_F = 16.25 + 0.125Q$

a) Find the demand equation for the dominant firm.
b) Calculate the profit-maximizing price and output for the dominant firm and the other firms.
c) Using graph paper, illustrate diagrammatically the profit-maximizing price and outputs.

$Q_L = 50$ P=25 $Q_F = 70$

(20 marks) 5. Discuss the following topics:

a) the relation between markup pricing and marginal pricing
b) cross-price elasticity of demand
c) law of diminishing returns*
d) limitations of linear breakeven analysis

* A diagram is required.

60 = 260 - 200

200 = 100

Q = 100

Concordia University
Faculty of Commerce and Administration
Department of Finance
Managerial Economics MBA 606/4 B and BB
Final Examination

Professor: Dr. B. Somers

April 27, 2015
7:00-10:00 p.m.

N.B. Crib sheets and any electronic devices capable of storing, transmitting, or receiving answers are strictly prohibited.

(20 marks) 1. Howarth's Inc., a manufacturer of men's suits, operates in a monopolistically competitive industry. The demand for its product is estimated by $P = 1{,}300 - 0.0125Q_d$ and its total cost function is $TC = 1{,}000{,}000 + 200Q + 0.015Q^2$.

a) Calculate the profit-maximizing price, output, and profit.
b) Using graph paper, **plot** the relevant functions to illustrate the profit-maximizing price and output.
c) Calculate the point price elasticity of demand at the profit-maximizing price and output and use this figure to calculate the optimal markup on cost. Does this give you the same price as determined in part a)? Explain.

(20 marks) 2. Proulx Pelouse is a company that provides lawn service for residential customers. Recently, management decided to practice price discrimination whereby it would charge a lower price to senior citizens. The following are estimates of the demand for its service:

$P = 750 - 0.5Q_d$ (regular clients)
$P = 600 - Q_d$ (seniors)

where Q is the number of contracts.

The total cost function is $TC = 100{,}000 + 50Q + 0.10Q^2$

a) Find the profit-maximizing price and output for each market and total profit.
b) Using graph paper, **plot** the relevant functions and illustrate how price and output is determined for each market.
c) Calculate the profit-maximizing price, output, and profit if there is no price discrimination.

(20 marks) 3. Acme Water Works is responsible for the water supply in the town of Somerville. The demand for its product is $P = 1.5 - 0.25\ Q_d$ where Q is in millions of cubic metres of water and P is the price of one cubic metre. The total cost function is $TC = 0.9 + 0.30Q + 0.05Q^2$.

a) Calculate the profit-maximizing price, output, and profit.
b) Using graph paper, **plot** the relevant functions to illustrate the profit-maximizing price and output.
c) Now suppose that the government regulates the monopoly and restricts it to an accounting or normal profit. Calculate the new price and output and illustrate these values in your diagram.

(20 marks) 4. The Co-Op Cab Company is acknowledged as the dominant firm and price leader in the market for taxi service in the city of Albany. Its marginal cost is $MC_L = 0.50 + 0.0005Q$. The market demand for taxi service is $P = 6 - 0.0025Q_d$ where Q is the number of kilometres in thousands and P is the price per kilometre. The combined marginal cost of other firms is $MC_F = 1 + 0.00375Q$.

a) Find the demand equation for the dominant firm.
b) Calculate the profit-maximizing price and output for the dominant firm and the other firms.
c) Using graph paper, **plot** the relevant functions and illustrate diagrammatically the profit-maximizing price and outputs.
d) If the price leader's total cost function is $TC = 500 + 0.5Q + 0.00025Q^2$, calculate this firm's total profit.

(20 marks) 5. Discuss the following topics:

a) Determinants of price elasticity of demand
b) Limitations of cost-volume-profit analysis (breakeven analysis)
c) The kinked demand curve as an explanation of an oligopolist's behaviour *
d) Optimal pricing for joint products produced in fixed proportions *

* A diagram is required.

Final 2004
P1

#1 $P = 800 - 0{,}002Q$ $\quad TC = 6\,400\,000 + 400Q + 0{,}002Q^2$

$TR = 800Q - 0{,}002Q^2$ $\quad MC = 400 + 0{,}004Q$

$MR = 800 - 0{,}004Q$

$800 - 0{,}004Q = 400 + 0{,}004Q$

$400 = 0{,}008Q$

$Q = 50\,000$

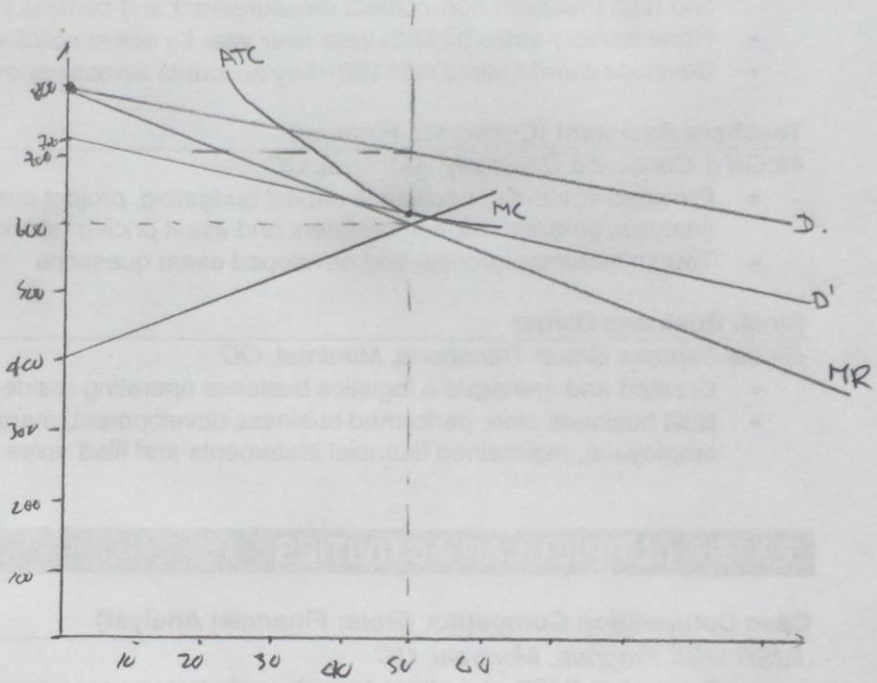
$P = 800 - 0{,}002Q$

$P(50\,000) = \$700$

$TR = 35\,000\,000$

$TC = 31\,400\,000$

$\pi\ \ 3\,600\,000$



(c) D ← fall tgt to ATC.

$ATC = 6\,400\,000Q^{-1} + 400 + 0{,}002Q$

$\frac{dATC}{dQ} = -6\,400\,000Q^{-2} + 0{,}002$

Slope min-sel $= -0{,}002$

$\frac{-6\,400\,000}{Q^2} + 0{,}002 = -0{,}002$

$-6\,400\,000 = 0{,}004Q^2$

$Q = 40\,000$

$ATC = 640\$$

$y = mx + b$

$640 = -0{,}002(40\,000) + b$

$b = 720\$$

$P = -0{,}002Q + 720\$$

Price Discrimination

Final 2004 P2

Reg

$P = 600 - 0{,}002 Q_R$

$0{,}002Q = 600 - P$

$Q_R = 300\,000 - 500P$

LI

$P = 400 - 0{,}008 Q_{LI}$

$0{,}008 Q_{LI} = 400 - P$

$Q_{LI} = 50\,000 - 125P$

Total

$TC = 4\,500\,000 + 10Q + 0{,}00096Q^2$

$MC = 10 + 0{,}00180Q_t$

π max @ $MR = MC$

$10 + 0{,}0018Q_t = 560 - 0{,}0032Q_t$

$0{,}005Q_t = 550$

$Q_t = 110\,000$

$MC(110\,000) = 10 + 0{,}0018(110\,000)$

$MC = 208$

$Q_t = 350\,000 - 625P$

$625P = 350\,000 - Q_t$

$P = 560 - 0{,}0016Q_t$

$TR = PQ = 560Q_t - 0{,}0016Q_t^2$

$MR = 560 - 0{,}0032Q$

$TC(110\,000) = 16\,490\,000$

© if No price discrimination

Q_t still 110 000.

→ Demand: $P = 560 - 0{,}0016Q^2$

$P(110\,000) = 384\$$

$TR = PQ = 42\,240k$

$TC = 16\,490k$

$\pi = 25\,750k$.

$MC_R = 600 - 0{,}004Q_R$

$208 = 600 - 0{,}004Q_R$

$Q_R = 98\,000$.

$MC_{LI} = 400 - 0{,}016Q$

$208 = 400 - 0{,}016Q$

$Q_{LI} = 12\,000$

$Q_t = 98\,000 + 12000 = 110\,800$ ✓

$P_R = 600 - 0{,}002(98k)$

$P_R = 404\$$

$P_{LI} = 400 - 0{,}008(12k)$

$P_{LI} = 304\$$

$TR = P_R Q_R$

$= 404 \times 98k$

$TR = 39\,592k\$$

$TR = PQ$

$= 12k \times 304\$$

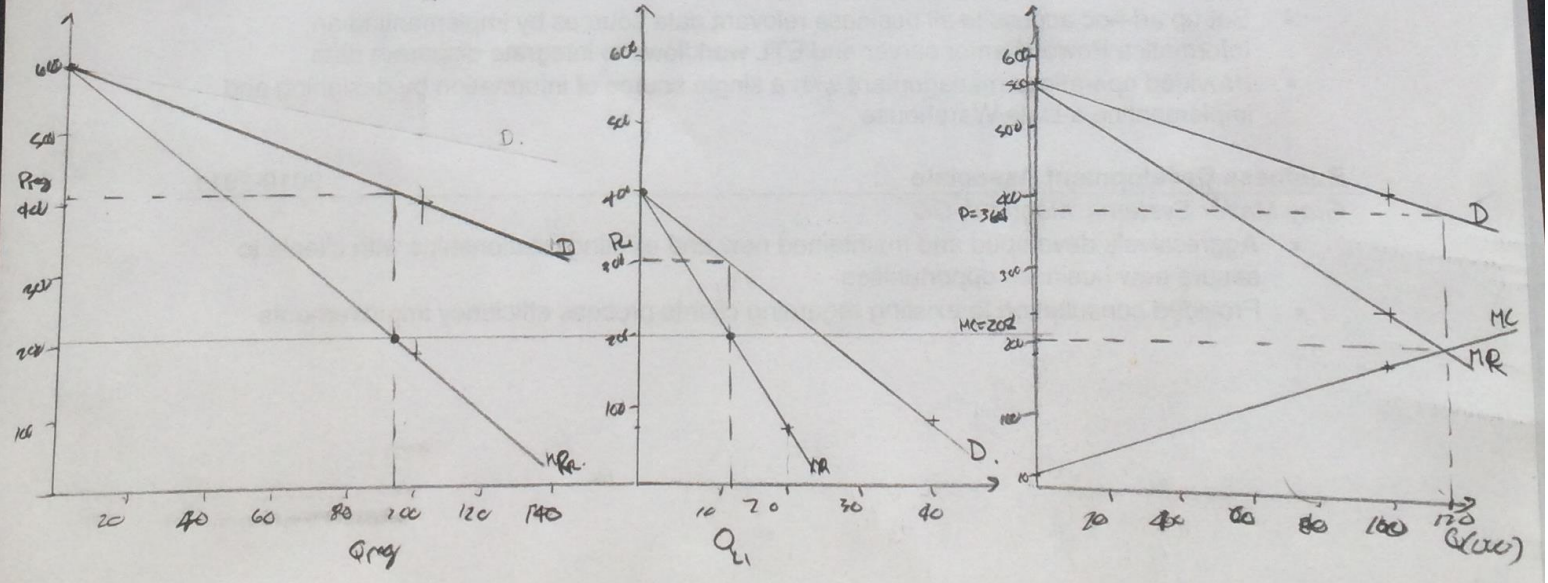
$TR = 3648$.

$TR = 43\,240k$

$TC = 16\,490k$

$\pi = 26\,750\,000$

Reg Location $/unit Actual



③ $P = 260 - 2Q_d$

$TR = 260Q - 2Q^2$

$MR = 260 - 4Q$.

π_{max} $MR = MC$

$60 = 260 - 4Q$

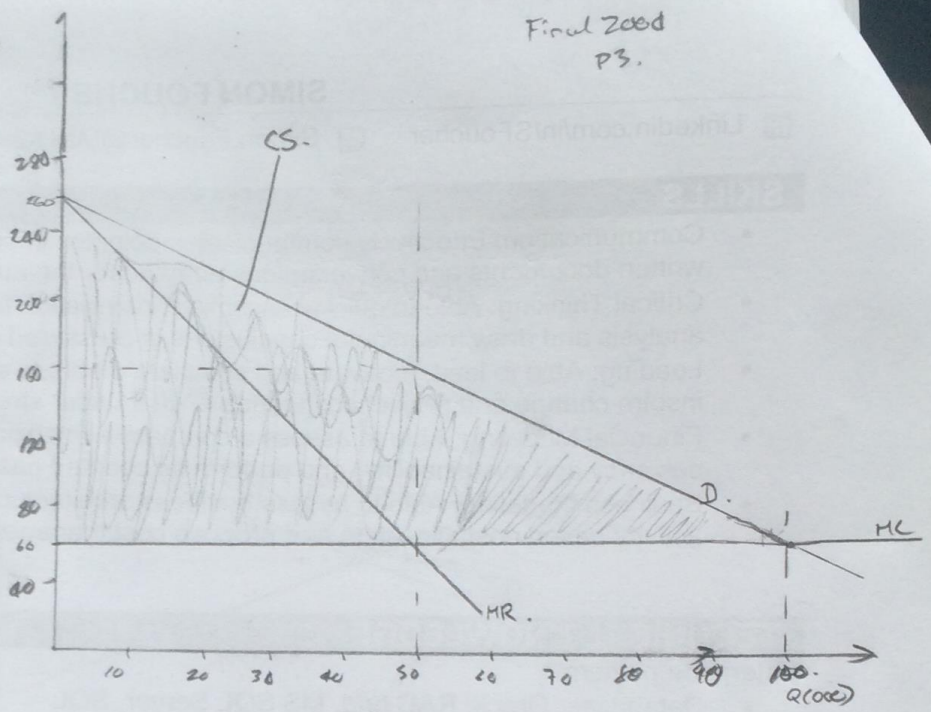
$4Q = 200$

$Q = 50$

$P = 260 - 2Q$

$P = 160$

$MC = 60$.



ⓒ $PS = \emptyset$.

CS = Area btw MC(S) & Demand.

intersection where $D = MC$

$260 - 2Q = 60$

$2Q = 200$

$Q = 100$.

$CS = \frac{100 \times (260 - 60)}{2} = 10\,000$.

flat fee: \$10 000.

New price: \$60

New Q: 100

④

Fiscal 2004

Leader

$MC_L = 18 + 0,04Q_L$

$Q_L = Q_t - Q_F$

$Q_L = (170-2P) - (8P-130)$

$Q_L = 300 - 10P$

$10P = 300 - Q_L$

$P = 30 - 0,1Q_L$

$TR_L = 30Q_L - 0,1Q_L^2$

$MR_L = 30 - 0,2Q_L$

Leader produces to $MC_L = MR_L$

$30 - 0,2Q_L = 18 + 0,04Q_L$

$12 = 0,24Q_L$

$Q_L = 50$

$P = 30 - 0,1Q_L$

$P = \$25$

leader

follower

$MC_F = 16,25 + 0,125Q_f$

followers accept price s#.

$P = MC_F$

$P = 16,25 + 0,125Q_f$

$0,125Q_f = P - 16,25$

$Q_f = 8P - 130$

$Q_f = 8(25) - 130$

$Q_f = 70$

market

$P = 85 - 0,5Q_t$

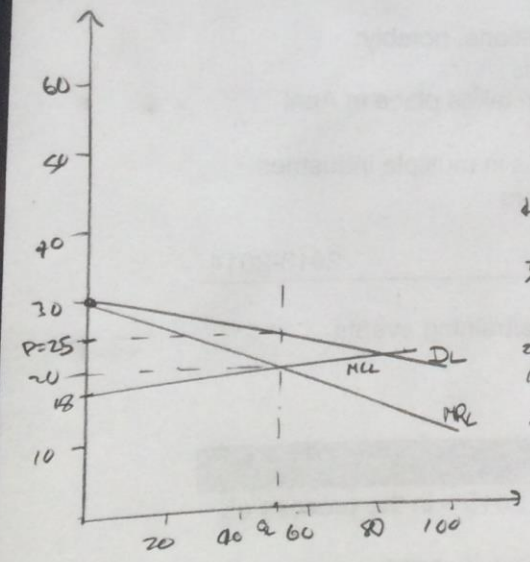
$0,5Q_t = 85 - P$

$Q_t = 170 - 2P$

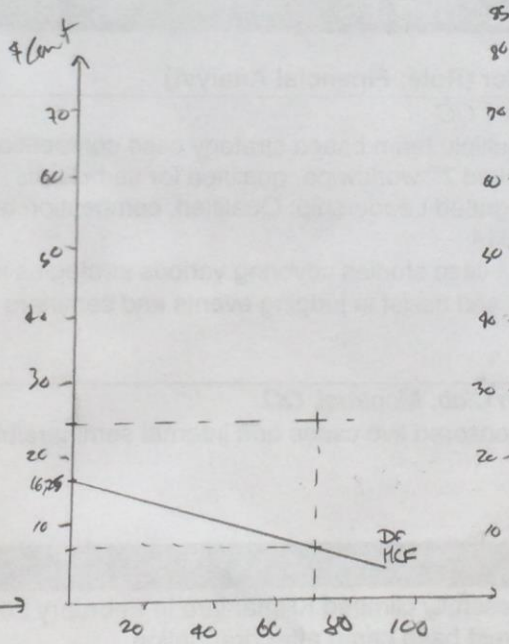
$Q_t = 170 - 2(25)$

$Q_t = 120$

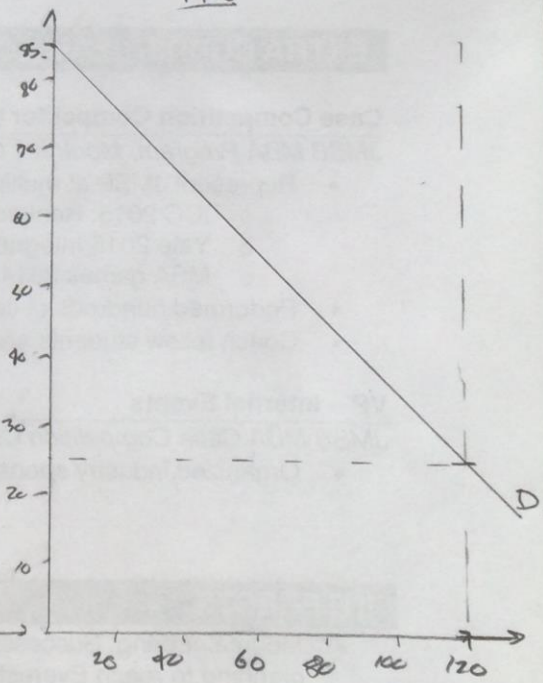
$Q_L + Q_f = 50 + 70 = 120$ ✓



follower



Mkt



Q

#1 $P = 1000 - 0{,}05Q$ $\quad TC = 500\,000 + 600Q$

$MC = 600.$

$TR = 1000Q - 0{,}05Q^2$

$MR = 1000 - 0{,}1Q$

π_{max} @ $MR = MC$

$1000 - 0{,}1Q = 600$

$0{,}1Q = 400$

$\boxed{Q = 4000}$

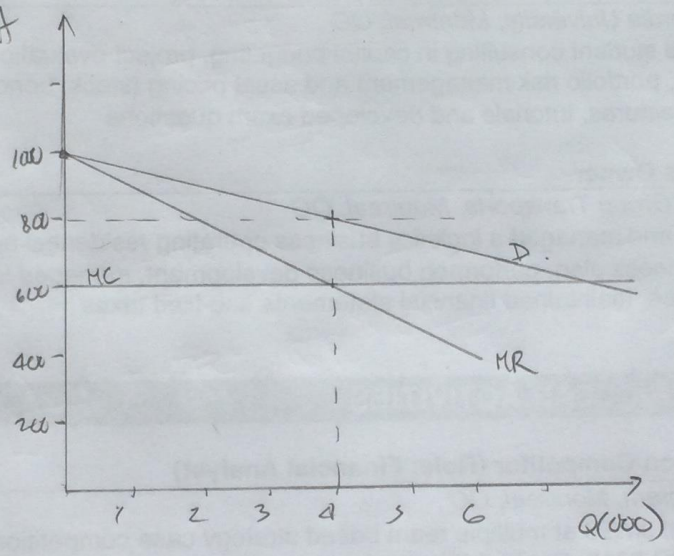
$P = 1000 - 0{,}05(4000)$

$\boxed{P = 800\$}$

$TR = PQ = 3{,}200\ M\$$

$TC(4000) = 2{,}900\ M\$$

$\boxed{\pi = 300\ K\$}$



© $E_p = \frac{\partial Q}{\partial P} \cdot \frac{P}{Q}$

$P = 1000 - 0{,}05Q$

$0{,}05Q = 1000 - P$

$Q = 20\,000 - 20P$

$\frac{\partial Q}{\partial P} = -20$

$E_p = (-20)\left(\frac{800}{4000}\right)$

$\boxed{E_p = -4}$

Markup

$MU = -\frac{1}{E_p + 1}$

$= -\left(\frac{1}{-4+1}\right)$

$= \frac{1}{3} = \boxed{33\%}$

Déc 2003

CND

$P = 250 - 0{,}01Q_c$

$0{,}01Q_c = 250 - P$

$Q_c = 25000 - 100P$

US

$P = 350 - 0{,}01Q_{US}$

$0{,}01Q_{US} = 350 - P$

$Q_{US} = 35000 - 100P$

$Q_c = 60000 - 200P$

$200P = 60000 - Q_c$

$P = 300 - 0{,}005Q_c$

$TR = PQ = 300Q_c - 0{,}005Q_c^2$

$MR = 300 - 0{,}01Q_c$

Market

$TC = 1000000 + 400 + 0{,}0002Q^2$

$MC = 40 + 0{,}0004Q$

Π max when $MC = MR$

$40 + 0{,}0004Q_c = 300 - 0{,}01Q_c$

$0{,}0104Q_c = 260$

$Q_c = 25000$

$MC(25000) = 40 + 0{,}0004(25000)$

$MC = 50$

$TC(25000) = 2{,}125\,M\$$

$\Pi = 2{,}375\,M\$$

$MC_{CND} = 250 - 0{,}02Q_{CND}$

$50 = 250 - 0{,}02Q_{CND}$

$0{,}02Q_{CND} = 200$

$Q_{CND} = 10000$

$MC_{US} = 350 - 0{,}02Q_{US}$

$50 = 350 - 0{,}02Q_{US}$

$0{,}02Q_{US} = 300$

$Q_{US} = 15000$

$Q_c = 25000$ ✓

$P_{CND} = 50 - 0{,}01(10K)$

$P_{CND} = \$150$

$P_{US} = 350 - 0{,}01(15K)$

$P_{US} = \$200$

$TR_{CND} = 1{,}500\,M\$$

$TR_{US} = 3{,}0\,M\$$

$TR = 4{,}5\,M\$$

② No price Disc

$Q_c = 25000$

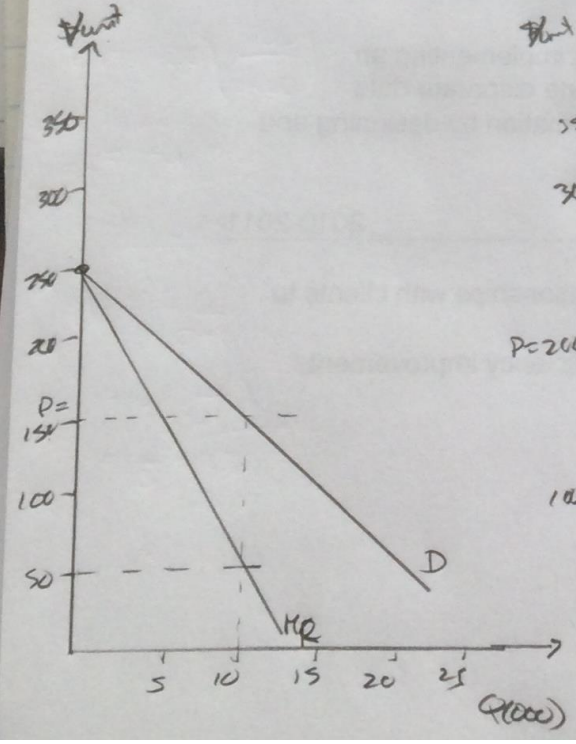
$P = 300 - 0{,}005Q_c$

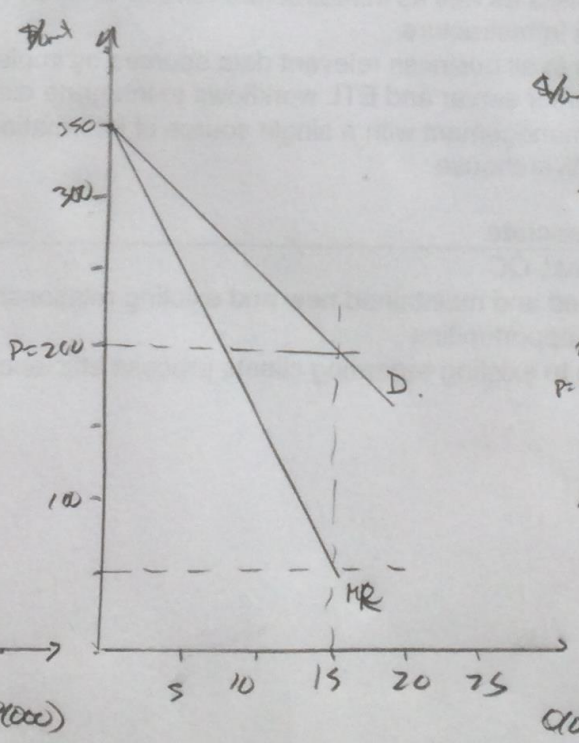
$P = \$175$

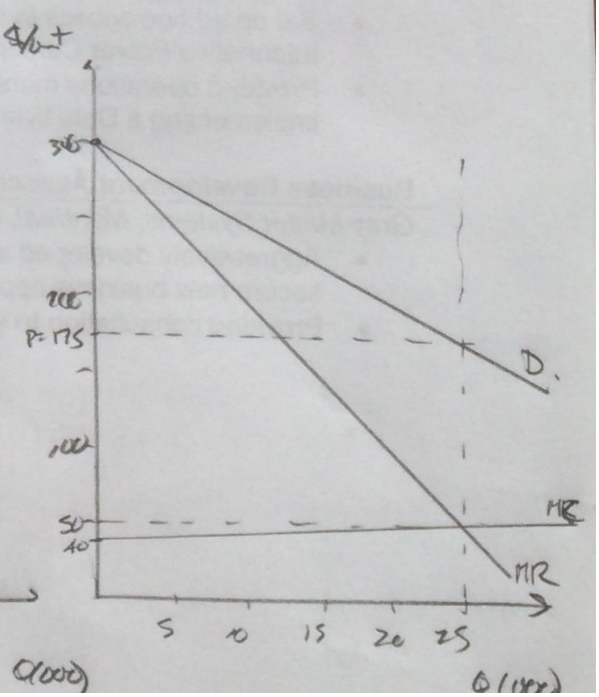
$TR = PQ = 4{,}375\,M\$$

$TC = 2{,}125\,M\$$

$\Pi = 2{,}250\,M\$$







#5 Cartel

Dec 2003.

Firm a

$TC_a = 150 + 0,5Q_a + 0,02Q_a^2$

$MC_a = 0,5 + 0,04Q_a$

$0,04Q_a = MC_a - 0,5$

$Q_a = 25MC_a - 12,5.$

Firm B

$TC_b = 90 + 1,5Q_b + 0,02Q_b^2$

$MC_b = 1,5 + 0,04Q_b.$

$0,04Q_b = MC_b - 1,5.$

$Q_b = 25MC_b - 37,5.$

mkt

$P = 6 - 0,01Q_t$

$TR = PQ = 6Q_t - 0,01Q_t^2$

$MR = 6 - 0,02Q_t$

$50\Sigma MC = Q_t + 50$

$\Sigma MC = 0,02Q_t + 1$

$Q_t = 50\Sigma MC - 50$

let $MC_a = MC_b = \Sigma MC$

$Q_a = 25(3,5) - 12,5$

$Q_a = 75.$

$Q_b = 25(3,5) - 37,5$

$Q_b = 50.$

$Q_t = 50 + 75 = 125$

π maximum $\Sigma MC = MR$

$6 - 0,02Q_t = 0,02Q_t + 1$

$0,04Q_t = 5$

$Q_t = 125$

$\Sigma MC = 0,02(125) + 1$

$\Sigma MC = 3,5$

$P = 6 - 0,01(125)$

$P = 4,75\$$

$TR = PQ = 75 \times 4,75$

$TR_a = 356,25\$$

$TC_a(75) = 300\$$

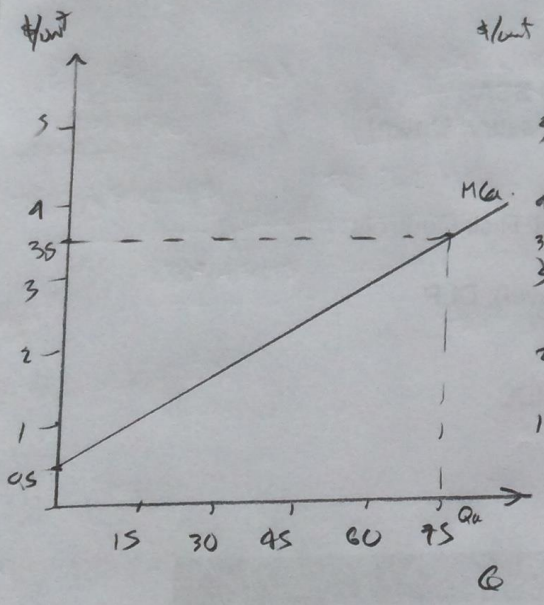
$\pi_a = 56,25\$$

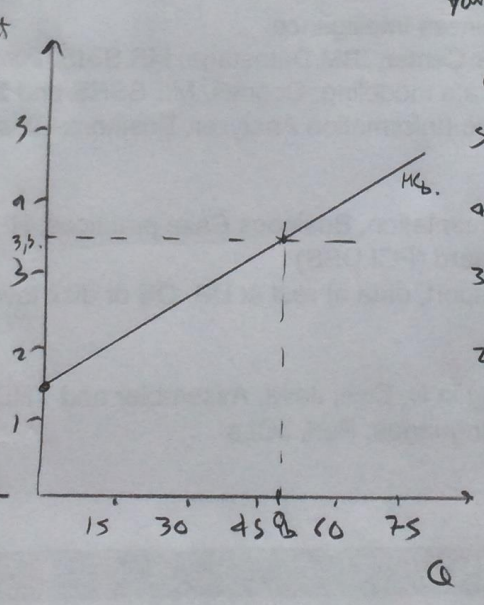
$TR = PQ = 50 \times 4,75$

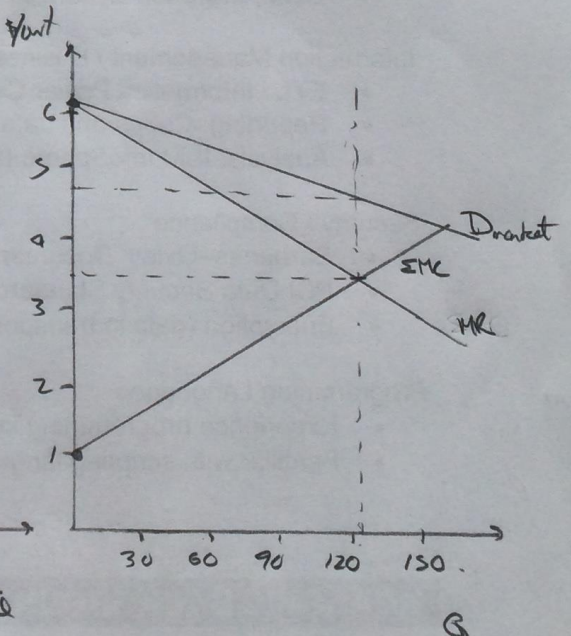
$TR_b = 237,5\$$

$TC_b = 215,0\$$

$\pi_b = 22,5\$$







① Joint Commodity

Inge

$P = 800 - 0{,}5Q_t$

$TR_t = 800Q_t - 0{,}5Q_t^2$

$MR_t = 800 - Q_t$.

Produce while $MR > 0$

or $Q_t < 800$

Fireworks

$P = 350 - 0{,}25Q_f$.

$TR_{FW} = 350Q_t - 0{,}5Q_t^2$

$MR_{FW} = 350 - \frac{1}{2}Q_t$

Produce while $MR > 0$

$Q_t < 700$.

Total

$TC = 300\,000 + 130Q + 0{,}1Q^2$

$MC = 130 + 0{,}2Q_t$

π max when $MC = \Sigma MR$.

$130 + 0{,}2Q_t = 1150 - 1{,}5Q_t$

$1{,}7Q_t = 1020$.

$Q_t = 600$ < 700 ✓.

$MR_{tot} = (800 - Q_t) + (350 - \frac{1}{2}Q_t)$

$MR_{tot} = 1150 - 1{,}5Q_t$ if $Q < 700$

$MR_{tot} = 800 - Q_t$ if $Q|_{700}^{800}$.

or $\emptyset$ (Do not produce) if $Q > 800$.

or

$130 + 0{,}2Q_t = 800 - Q_t$

$1{,}2Q_t = 670$

$Q_t = 558 < 700$ ✓

$P_t = 800 - 0{,}5(600)$

$P_t = 500\$$

$TR_t = 500 \times 600$

$TR_t = 300\,000$

$P_{FW} = 350 - 0{,}25(600)$

$P_{FW} = 200$

$TR_{FW} = 200 \times 600$

$TR_{FW} = 120\,000$

$TR = 420\,000\$$

$TC(600) = 414\,000$

$TR = 420\,000$

$\pi_{tot} = 6\,000\$$