Economics 4301 Assignment #1 Answer Key

Question #1:

(a) Since there are 95 taxicabs and each taxi provides 20 rides per day, the total quantity supplied is:

$$Q^S = 95 \cdot 20$$

$$\therefore Q^S = 1900$$

- In order to find the equilibrium price we set demand equal to supply:

$$Q^D = Q^S$$

$$1000 - 20p + 1000(\$1) = 1900$$

$$2000 - 1900 = 20p$$

$$\therefore \boxed{p^* = \$5}$$

- The number of rides per day is $\boxed{Q = 1900}$

- The profit for each taxicab is:

$$\pi_i = p \cdot q_i - c \cdot q_i$$

$$= 5 \cdot 20 - 5 \cdot 20$$

$$= 100 - 100$$

$$\therefore \boxed{\pi_i^* = 0}$$

- The taxicab market is in a long-run equilibrium because there is no incentive for firms to enter or exit the market.

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(b) In this case, the demand for taxicabs has increased

$$Q^D = 1000 - 20p + 1000(2.00)$$
$$= 1000 - 20p + 2000$$
$$\therefore Q^D = 3000 - 20p$$

- Setting demand equal to supply:

$$Q^D = Q^S$$
$$3000 - 20p = 1900$$
$$1100 = 20p$$
$$\therefore \boxed{p^* = 55}$$

- The number of rides per day is $\boxed{Q^* = 1900}$

- The profit for each taxicab is:

$$\pi_i = p \cdot q_i - c \cdot q_i$$
$$= 55 \cdot 20 - 5 \cdot 20$$
$$= 1100 - 100$$
$$\therefore \boxed{\pi_i = 1000}$$

- In the long run we will see entry until $p = mc$

$$Q = 3000 - 20 \cdot 5$$
$$= 3000 - 100$$
$$\therefore \boxed{Q^* = 2900}$$

- Since $p = mc$ we have $\boxed{p^* = 5}$

- The profit for each cab is:

$$\pi_i = p \cdot q_i - c \cdot q_i$$
$$= 5 \cdot 20 - 5 \cdot 20$$
$$= 100 - 100$$
$$\therefore \boxed{\pi_i = 0}$$

- Note that the number of taxicabs has increased to $\boxed{145}$

(c) In this case, the demand for taxicabs has decreased

$$Q^D = 1000 - 20p + 1000(0.80)$$
$$= 1000 - 20p + 500$$
$$\therefore Q^D = 1500 - 20p$$

- Due to the decrease in demand, firms will exit the market until $p = mc$
- Since $p = MC$ we have $\boxed{p^* = 5}$

$$Q = 1500 - 20 \cdot 5$$
$$= 1500 - 100$$
$$\therefore \boxed{Q^* = 1400}$$

- The profit for each cab is:

$$\pi_i = p \cdot q_i - c \cdot q_i$$
$$= 5 \cdot 20 - 5 \cdot 20$$
$$= 100 - 100$$
$$\therefore \boxed{\pi_i = 0}$$

- Note that the number of taxicabs has decreased to $\boxed{70}$

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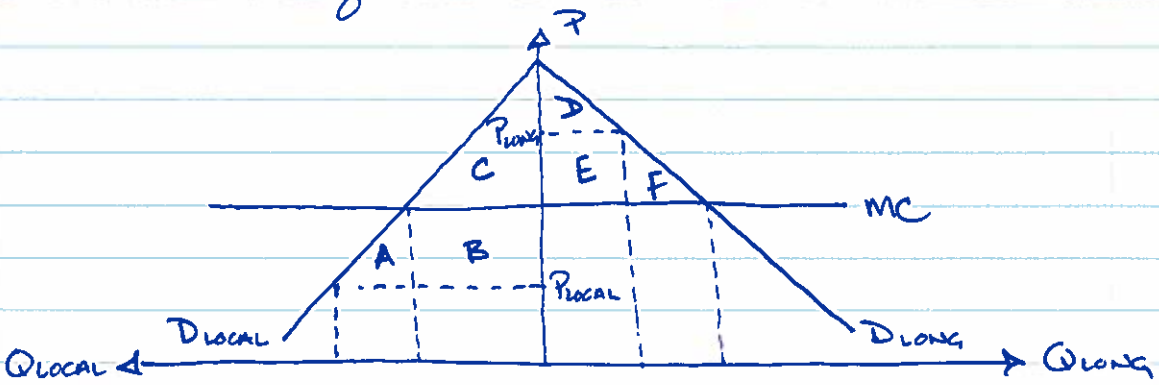
QUESTION # 3:

- Assume linear demand and that marginal costs are constant and equal in the two markets.



- PARETO IMPROVEMENT: a reallocation such that consumers in one market can be made better off without making consumers in other markets worse off

- POTENTIAL PARETO IMPROVEMENT: a reallocation such that the consumers who are made better off could compensate the consumers who are made worse off and still remain better off.

$CS_{LOCAL} = A + B + C$ $\quad CS_{LONG} = D$

$CS'_{LOCAL} = C$ $\quad CS'_{LONG} = D + E + F$

- By moving prices towards costs, the consumers in the long distance market are made better off (CS increases), but consumers in the local market are worse off (CS decreases). Therefore moving prices towards marginal cost is NOT a Pareto Improvement

- However, depending on demand and cost conditions it could be a potential Pareto Improvement.

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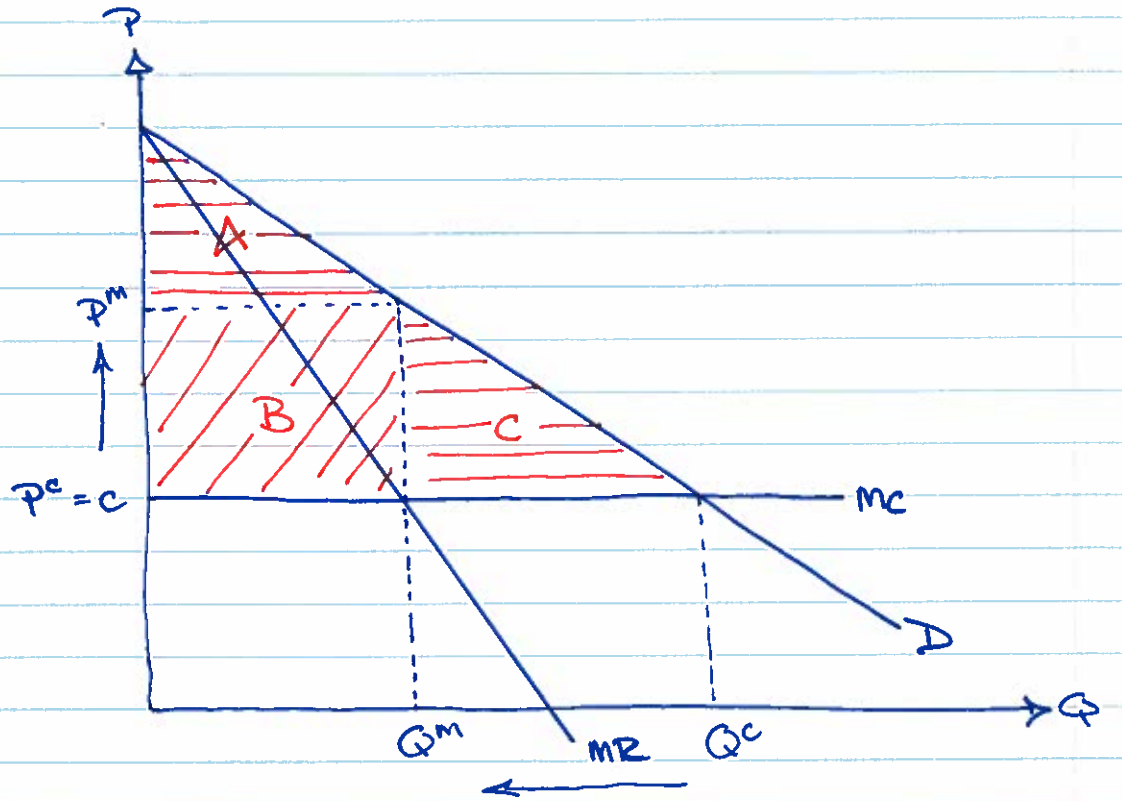
QUESTION # 4



- Under perfect competition price is equal to marginal cost. Under monopoly, the equilibrium price and quantity is determined where MR = MC

(i) The market price increases from P^c to P^m
(ii) The equilibrium output decreases from Q^c to Q^m
(iii) Economic profit increases from 0 to area B
(iv) Consumer surplus decreases from areas (A+B+C) to area A
(v) Efficiency or total surplus decreases due to the restriction on output and the subsequent formation of the deadweight loss triangle, area C.

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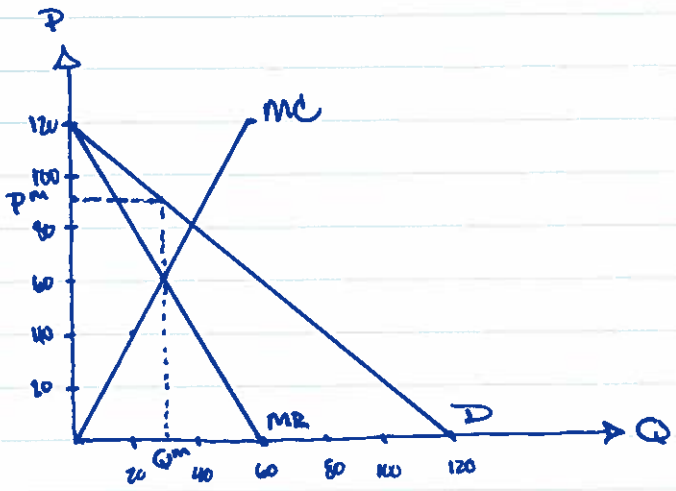
QUESTION #5:



(a) The monopolist maximizes profit by setting MR = MC

$$120 - 2Q = 2Q$$
$$120 = 4Q$$
$$\therefore \boxed{Q^m = 30}$$

$$\Rightarrow P^m = 120 - Q^m$$
$$= 120 - 30$$
$$\therefore \boxed{P^m = 90}$$

(b) The monopolist maximizes profit by setting MR = MC, but notice that neither marginal revenue nor marginal cost change as a result of the lump-sum tax. Therefore, the answer is the same as part (a).

$$\therefore \boxed{Q^m = 30} \quad \boxed{P^m = 90}$$

(c) Total surplus is maximized when P = MC.

$$120 - Q = 2Q \quad \Rightarrow P = 120 - Q$$
$$120 = 3Q \qquad = 120 - 40$$
$$\therefore \boxed{Q = 40} \qquad \therefore \boxed{P = 80}$$

Therefore, the price ceiling is $80 and 40 units are produced.

QUESTION # 7

(a) The manufacturer should charge Type 1 individuals $4 or the amount that they value the good.

- Since their time cost is $1.25 for using the coupon, the coupon would have to offer at least this large a discount before the Type 1's were tempted to use them.

(b) At a price of $4, the Type 2 individuals will only buy cereal if they receive a discount of $1, or the difference between their valuation and the price they must pay.

(c) From parts (a) and (b), the manufacturer should set a price of $4 and a coupon discount of $1 (ie. the Type 1's don't use the coupon and the Type 2's do).

- This means that the manufacturer is making a profit of $1.50 from the Type 1's and $0.50 from the Type 2's.

- An increase in manufacturing costs of $0.50 would reduce the profits from Type 2 individuals to ZERO and thus, there is no longer an incentive to offer coupons.

QUESTION # 8:

(a) The total demand is:

$$D(p) = q^r + q$$

$$= 18 - 5p + 10 - 2p \qquad \therefore D(p) = 28 - 7p$$

- The inverse demand curve is

$$P(Q) = 4 - 1/7(Q)$$

- The monopolist maximizes profits when:

$$MR = MC$$

$$4 - 2/7(Q) = 2$$

$$2/7(Q) = 2 \qquad \therefore \boxed{Q^* = 7}$$

$$\Rightarrow P = 4 - 1/7(7) \qquad \therefore \boxed{P^* = 3}$$

(b) For the under 25 crowd we have an inverse demand of:

$$p^r(q^r) = (18/5) - (q^r/5)$$

The firm maximizes profits in this market

$$MR = MC$$

$$\frac{18}{5} - \frac{2}{5} q^r = \frac{10}{5}$$

$$8/5 = 2/5(q^r) \qquad \therefore \boxed{q^r = 4}$$

$$\Rightarrow p^r = (18/5) - 4/5 \qquad \therefore \boxed{p^r = 2.8}$$

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- For the over 25 crowd we have an inverse demand:

$$p(q) = 5 - (1/2)q$$

- The monopolist maximizes profits in this market

$$MR = MC$$

$$5 - q = 2 \quad \therefore \boxed{q = 3}$$

$$\Rightarrow p = 5 - (1/2)\cdot 3 \quad \therefore \boxed{p = 3.5}$$

(c) In this situation the firm sets price equal to marginal cost and sets the access charge equal to consumer surplus.

- For the under 25 crowd we have: $\boxed{p^r = 2}$

$$CS(2) = (1/2)(18 - 5(2))(18/5 - 2)$$
$$= (1/2)(8)(8/5)$$

$$\therefore \boxed{\text{ACCESS CHARGE} = \$6.40}$$

- For the over 25 crowd we have: $\boxed{p = 2}$

$$CS(2) = (1/2)(10 - 2(2))(5 - 2)$$
$$= (1/2)(6)(3)$$

$$\therefore \boxed{\text{ACCESS CHARGE} = \$9.00}$$

(d) In this case, if the nightclub charged an access price of \$9.00 they will not attract the under 25 crowd since their consumer surplus is only \$6.40.

- Therefore, the pricing scheme that attracts both types

$$\boxed{p = \$2.00} \quad \& \quad \boxed{\text{ACCESS CHARGE} = \$6.40}$$

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