

CARLETON UNIVERSITY
Department of Economics
ECON 4301 A
Market Structure and Firm Behaviour
2012 Fall
ASSIGNMENT #1

DUE BY 17:30 FRIDAY OCTOBER 5, 2012

Marks will be deducted if the presentation of your answers is not intelligible, coherent, and comprehensive. All graphs should be readily decipherable and clearly labeled. Any mathematical derivations should be documented. **THIS MEANS THAT EXCEPT FOR ALGEBRAIC SIMPLIFICATIONS, YOU MUST SHOW AND EXPLAIN EACH STEP OF THE DERIVATION.** This assignment is worth 15% of your grade.

1. Suppose that there are 95 taxicabs and that the City of Ottawa decides that it is time to enter the Industrial Age and provide its citizens with an alternative mode of transportation: light rail transit (LRT). The new demand curve for taxi rides is $D(p) = 1000 - 20p + 1000f$, where f is the fare per LRT ride, measured in dollars. Suppose that city council sets $f = \$1.00$.
 - a) Find the short-run competitive equilibrium: the price per ride, number of rides per day, and the profit per cab per day. Is the taxicab market in long-run equilibrium?
 - b) Suppose the City of Ottawa increases LRT fares to \$2.00. What are the new short-run and long run equilibria?
 - c) Suppose the City of Ottawa decreases LRT fares to \$0.50. What are the new short-run and long run equilibria?
2. Find the range of outputs for which the cost function $C(q) = f + cq^2$ is characterized by (i) economies of scale, (ii) diseconomies of scale, and (iii) constant returns to scale. Are there economies of scale if $f = 0$?
3. In many countries including Canada, the price of long-distance telephone service was held above its marginal cost and the price of local service below its marginal costs. Explain why moving prices towards costs is not a Pareto improvement, but is a Potential Pareto improvement. [*Hint: Use two diagrams and assume that marginal costs are constant.*]

4. Assume that the dairy industry is initially in a perfectly competitive equilibrium. Assume that, in the long run, the technology is such that average cost is constant at all levels of output. Suppose that producers agree to form an association and behave as profit-maximizing monopolists. Explain clearly in a diagram the effects on (i) market price, (ii) equilibrium output, (iii) economic profit, (iv) consumer surplus, and (v) efficiency.
5. Suppose there is a monopolist that faces the following demand and cost functions:

$$P(Q) = 120 - Q$$

$$TC(Q) = Q^2$$

- a) Calculate the monopoly profit maximizing price and quantity.
 - b) If you charge the monopolist a \$100 lump-sum tax, how much output would they produce?
 - c) If you wanted to choose a price ceiling for this monopolist in order to maximize total surplus, what price ceiling would you choose? How much output is produced at this price?
6. Two goods, 1 and 2 are related in demand. Their respective inverse demand functions are:

$$P_1(q_1, q_2) = 22 - 2q_1 + q_2$$

$$P_2(q_1, q_2) = 22 + q_1 - 2q_2$$

Each good is produced at a constant marginal cost of \$2 per unit.

- a) Are the two goods complements or substitutes?
- b) If goods 1 and 2 are each produced by a monopolist (i.e. one monopolist produces good 1 and another monopolist produces good 2), find the respective monopoly prices and quantities of goods 1 and 2. [*Hint: You will have to solve simultaneous equations.*]
- c) If goods 1 and 2 are produced by a single multi-product monopolist, find the multi-product monopoly prices of goods 1 and 2.
- d) Explain the difference between the single product monopoly prices in (b) and the multi-product monopoly prices in (c).

7. Consider a cereal manufacturer with two types of customer. Type 1 individuals have a reservation price of \$4, and using a coupon costs them \$1.25 (in terms of effort/time). Type 2 individuals have a reservation price of \$3, and using the coupon does not cost them anything. It costs the manufacturer \$2.50 to produce each box of cereal.
- What price should the manufacturer charge the type 1's? How large a discount could the coupons offer without tempting the type 1's to use them?
 - At the above price, how large a discount would the coupon have to offer to induce the type 2's to buy cereal?
 - What price and coupon discount should the manufacturer set? Calculate the profits he receives from each group. Would he still offer coupons if the manufacturing cost suddenly rose to \$3?
8. A nightclub manager realizes that demand for drinks is more elastic among students, and is trying to determine the optimal pricing schedule. Specifically, he estimates the following average demands:

$$\text{Under 25: } q^r = 18 - 5p$$

$$\text{Over 25: } q = 10 - 2p$$

The two groups visit the nightclub in equal numbers on average. Assume that drinks cost the nightclub \$2 each.

- If the market cannot be segmented, what is the uniform monopoly price?
- If the nightclub can charge according to whether or not the customer is a student but is limited to linear pricing, what price (per drink) should be set for each group?
- If the nightclub can set a separate cover charge and price per drink for each group, what two-part pricing schemes should it use?
- Now suppose that it is impossible to distinguish between types. If the nightclub lowered drink prices to \$2 and still wanted to attract both types of consumer, what cover charge would it set?