Econ3101 - Section 006
Intermediate Microeconomics

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Due: Wednesday, March 21st, 2012.

Homework 3.

The maximum score is 100 points. Present all nal answers neatly on these provided pages. Note that some Exercises have several parts, and each part may conceal more than one task for you. Be sure to answer every question thoroughly for full credit! Show any relevant calculations neatly. Please do your scratchwork somewhere else.

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1. Consider a perfectly competitive industry where each (identical) rm has the following total cost function:

\[ C(q) = 1 + 225q^2 \]

The market demand facing the industry is as follows:

\[ Q^d(p) = (100 - p) \frac{34}{525} \]

where \( p \) is the market price. **Circle your final answer!**

(a) Define a competitive equilibrium in the Short Run.

(b) Following that definition, compute the equilibrium if the number of firms equals \( N = 153 \).

(c) Compute the firm's individual profit and predict whether the number of firms will increase, decrease or stay the same in the Long Run.

(d) Define a competitive equilibrium in the Long Run.

(e) Following that definition, compute the equilibrium in the Long Run.
2. Now suppose that the government levies a lump sum tax on all rms in the market of the previous exercise (i.e. use the previous information on demand and costs).

(a) Write down the new cost function. Then compute and compare the marginal cost before and after the implementation of the lump sum tax. Do the same for the average total cost. Conclude whether the short run and/or the long run equilibria will change. Support your conclusion relating it to the changes in cost!

(b) Suppose that the number of rms in the industry is equal to the long run $N^*$ found in the previous exercise. Find the short run equilibrium and the equilibrium individual profit. Circle your final answers!

(c) Compute the equilibrium in the Long Run. Circle your final answers!
3. Now suppose that the government levies an **excise tax** on all rms in the same market.

(a) Write down the new cost function. Then compute and compare the marginal cost before and after the implementation of the **excise tax**. Do the same for the average total cost. Conclude whether the short run and/or the long run equilibria will change with respect to . **Support your conclusion relating it to the changes in cost!**

(b) Suppose that the number of rms in the industry is equal to the long run $N^*$ found in the the first exercise. Find the short run equilibrium and the equilibrium individual profit. **Circle your final answers!**

(c) Compute the equilibrium in the Long Run. **Circle your final answers!**
4. Consider a monopolist that faces a linear inverse demand of:

\[ P(q) = 100 - (1/4)q \]

and has a cost function of the form:

\[ C(q) = 2438 + 4q \]

(a) What are the monopolistic market price, quantity, and profits?

(b) If the government follows a price control regulation, setting effectively \( P = MC \), what will be the firm’s reaction in the long run? Would this be fixed by setting \( P = ATC \)?

(c) What will be the subsidy required to induce the monopolist to choose \( q^* \) such that \( P(q^*) = MC(q^*) \)?
5. A profit maximizing monopolist has marginal costs given by: \( MC(Q) = 2Q \), where \( Q \) is the monopolist's total output (thus, you may rewrite marginal cost as \( MC(q) = 2(q_1 + q_2) \)). The monopolist can sell her output in two geographically separate markets. Demand in the two markets is, respectively:

Market 1: \( P_1(q_1) = 52 - 68q_1 \)

Market 2: \( P_2(q_2) = 58 - 24q_2 \)

Assume the monopolist can prevent all resale of its product between Markets 1 and 2. That is, there are no arbitrage opportunities for the consumers in Markets 1 and 2. Answer the following.

(a) How much does the firm sell in each market?

(b) What price does the monopolist charge in each market?

(c) In equilibrium, what is the price elasticity of demand in each market?

(d) Compare your answers for market 1 and 2, in b) and c). Does it make sense? Why/why not?