Quiz #2

Problem 1 Each firm in a competitive market has a cost function of $c(Q) = 72 + 2Q^2$, meaning each firm has a marginal cost of $MC = 4Q$.

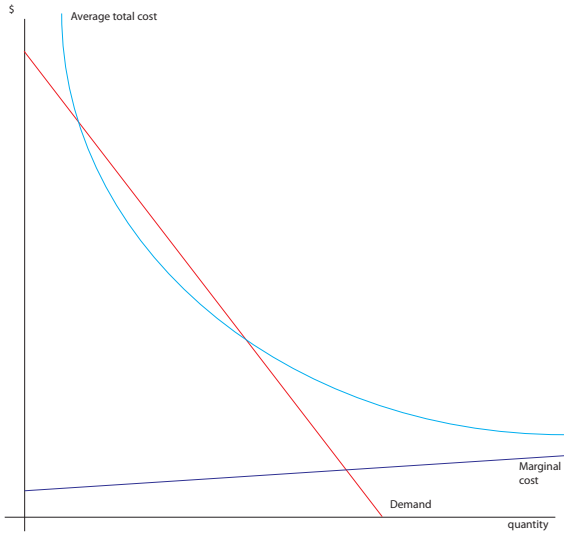
a. Suppose the price is \$20. Determine how much each firm produces in the short-run, their profits, and say what will happen in the long run (entry, exit, or nothing).

Each firm produces 5 units and loses \$22. In the long run, there will be exit.

b. Determine the long-run equilibrium price. Describe, in words, the process that moves the industry from the price in part a. to the price in part b.

In the long run, $ATC = MC$, or $\frac{72}{Q} + 2Q = 4Q$. Thus, each firm produces $Q = 6$, and the long-run price is \$24. The price increases from the short- to the long-run because when firms exit, the supply curve shifts to the left, putting upward pressure on the price.

Problem 2 The figure below plots the demand, marginal cost, and average total cost for Insight Communications, where quantity is the number of households to which Insight provides cable service.



a. Based on the picture, is Insight a natural monopoly? Explain why or why not.

Yes, as average total cost is decreasing over the entire range of quantity.

b. Suppose Lexington were to implement a price ceiling on Insight. Explain, possibly with the aid of a picture, how such a price ceiling could be efficiency-improving (in the sense of reducing the difference between price and marginal cost).

Absent a ceiling, Insight prices where $MC = MR$, and earns a markup over marginal cost. A price ceiling would compel Insight to produce a greater quantity by removing their incentive to sell to fewer households in order to inflate the price.

c. Is it possible for Lexington to set a price ceiling such that the result is allocatively efficient? Discuss why or why not.

Yes, Lexington can set a price ceiling at the price for which $MC = ATC$. However, at this price, Insight will be losing money, and so they would need to be subsidized in order to stay in business. The most efficient price ceiling without a subsidy is where ATC crosses the demand curve.

Problem 3 An airline has two types of customers, tourists and business travelers. Tourists have demand function $p = 30 - q$, where q is the level of amenities (quality) for a purchased seat. Business travelers have demand $p = 40 - q$. Suppose that fraction $\frac{1}{10}$ of all travelers are business travelers, while $\frac{9}{10}$ are tourists.

The airline chooses a quality level q. For simplicity, assume that there is no cost to the airline of setting a given quality level, or to taking on an additional passenger.

a. Suppose the airline is constrained to only be able to set one quality level throughout its planes. What quality level should it set, and what price should it charge for a ticket?

If the airline decides it will only sell to business travelers, it will set $q = 40$ and charge a price of \$800, making a per-customer profit of \$80. If it decides to sell to both tourists and business travelers, it will set quality equal to 30, and set the price of a ticket equal to \$450, earning a per-customer profit of \$450. Clearly, the latter is better.

b. Fact: if the airline has both a first class and a coach section on the plane, the profit-maximizing price for a coach ticket will be lower than the price you solved for in part a. Explain the economic intuition behind this fact.

Airlines set a low quality in coach not to annoy the people who sit in coach, but to annoy annoy the people who don't sit in coach, namely the first class customers. The worse coach is, the more a first class customer is willing to pay for a first class ticket, as the alternative is worse.

Problem 4 A single-price monopolist manufactures hats, and its cost of producing Q hats is $c(Q) = \frac{1}{4}Q^2$, so its marginal cost is $MC = \frac{1}{2}Q$. The firm faces the demand curve $P = 90 - 2Q$.

a. Find the firm's profit-maximizing price and quantity.

The firm maximizes its profits at $Q = 20$ and $P = \$50$.

b. Now suppose that, in addition to producing its own hats, the firm can also obtain identical hats from a supplier in Berzerkistan for \$12 each. How many hats will the firm sell now? Of these, how many does the firm produce itself and how many does it obtain from Berzerkistan?

The firm's marginal cost of producing its last hat in part a. is \$10. Therefore, it cannot save any money by importing any hats, as it can produce all the hats it needs more cheaply itself.

c. Consider the same situation in part b., but now suppose the firm's demand curve increases to $P = 162 - 2Q$. How many hats will the firm sell now? Of these, how many does the firm produce itself, and how many does it obtain from Berzerkistan?

Were the firm to produce all its hats itself, its optimal price and quantity would be $Q = 36$, $P = \$90$. However, the firm's marginal cost for the last unit produced would be \$18, meaning it would have been cheaper to have imported some units from Berzerkistan. They should produce their own hats until their marginal cost equals \$12, then begin importing. To solve for profit-maximizing number sold, set marginal cost equal to 12, as this will be the cost of their last hat produced. Setting 12 equal to marginal revenue gives $Q = 37.5$, $P = \$87$. They will produce 24 hats themselves, and import the remaining 13.5.