



## Homework 2

due September 24, 2018

Homework must be submitted BEFORE the beginning of the lecture in piles by group number on the due day. If you come to the lecture late, your homework will be penalized with -20%. Submissions in any other way or after the lecture will be ignored. Your name and your group number must be clearly visible on the TOP-RIGHT CORNER of your paper. Any paper which does not resemble work by a student of a world-class institution (not in A4 sheets, not clean, illegible, unnamed, unstapled, unlabeled tasks, final results not in boxes etc.) will be penalized with up to 50 points at the discretion of the grader. Do not submit your work in plastic covers. Copying in homework will be penalized with a 0 in that assignment and an additional penalty of 10 points in the course homework average. Students who give their homework away for others to copy from will be penalized with 0 in that assignment and a penalty of 30 points in their course homework average. Repeated offenders will be terminated from the course.

1. The demand for a good is  $q = 50 - p$ . A monopolist's cost is  $C = 10 + q$ .
  - (a) Show the market demand, marginal revenue, average cost and total cost on a properly labeled diagram. [5p]
  - (b) Indicate the monopoly market outcome and the PC outcome on the same diagram. [5p]
  - (c) In a separate diagram indicate the monopoly's profit, the consumer surplus and the deadweight loss. [5p]
  
2. Assume that the market demand for a product is  $q = 100 - 2p$  and that there is only one firm with total cost function  $C(q) = 20 + 0.5q$ .
  - (a) Derive the monopoly price, output and profit. [5p]
  - (b) Derive is the PC output and the DWL for the monopoly market. [2p]
  - (c) Derive the CS for the monopoly market. [3p]
  - (d) Compare the monopoly's profit, the CS and the DWL. [5p]
  - (e) Find how profit, CS, and DWL would be affected by the slope of the demand curve. [10p]
  - (f) Find how profit, CS, and DWL are affected by the slope of the cost. [10p]
  
3. A monopolistic company has cost  $C(q_t) = 25q_t - 0.1q_{t-1}$ . In any year  $t$  that the company operates,  $q_t$  denotes quantity in year  $t$  and  $q_{t-1}$  denotes the quantity of the year before year  $t$ . The company faces demand  $q_t = 100 - 0.5p_t$ .
  - (a) Find the quantity, price and profit for the monopolist for the first year of operation if the manager cares to maximize only the current year's profit every year. [5p]
  - (b) Find the quantity, price and profit for the monopolist for the second year of operation if the manager cares to maximize only the current year's profit every year. [5p]
  - (c) Find the quantities, prices and profits for the monopolist for both years of operation if the manager cares to maximize the sum of the first and the second years' profits. Assume no time discount. [10p]
  - (d) Compare the profits in the two first years of operation, if this manager cares for future profits or not. Explain why profits are different. [10p]
  
4. An industry has 51 firms. 50 firms behave in a PC manner and have identical costs  $C(q) = 0.5q^2$ . The 51<sup>st</sup> firm has zero marginal cost and behaves as a monopolist. The demand for the product is  $q = 1000 - 50p$ . If the monopolist is the one who sets the price and the other 50 firms are price takers, find the price, the quantity of the monopolist and the total quantity of the 50 firms. [20p]

Good afternoon!

Here is why we insist in turning in a neat and professional looking homework: Last year, the head of recruiting at BCG told the participants of the 'Professionalism Short-course' that nearly 25% of the job candidates send their applications with important mistakes (digits missing in phone number, typos, grammatical mistakes etc.). She said: *"We do not even bother to save a file for those applicants. They go directly to the trash bin. If they were not taught to write their name, to supply a decent document that one can read and to know the name of the company they want to work for, they will -for sure- embarrass us to our clients; therefore, they do not deserve a job here."* Doing a good job on ANYTHING that contains your name should not be a choice. Contrary to what most people believe, success is not a matter of making the right choices – losers make choices! Successful people know only one way: to do a good job. ALWAYS! Success comes from habits, not choices. This is how you build your brand... this is how you gain personal value.

Kosmas

---

*Estimated completion time: 160 min*

*Difficulty level (normalized to exam standards): 1.2/5 2. 5/5 3. 5/5 4. 8/5*