



Practice Set 2

Perfect Competition

This problem set contains material for the relevant lab. Lab teachers are expected to provide sufficient guidance for the entire problem set. It is in the teacher's discretion to select the most representative tasks to solve instructionally in every lab. For the rest of the tasks, methodology, hints and final answers will be provided. Students are expected to work on practice problems, however, they are not required to submit written solutions. It is a non-negotiable policy in this course to not provide handouts with the solutions of practice problem sets.

1. Consider the following table for the Total Revenue and the Total Cost for a firm.

Q	TR	TC
0	\$0	\$15
1	\$30	\$25
2	\$60	\$40
3	\$90	\$60
4	\$120	\$85
5	\$150	\$115
6	\$180	\$150

- (a) Explain if the table provides any indication that this firm is perfectly competitive.
- (b) Explain if this table refers to the short-run or long-run period.
- (c) Graph the cost structure of the firm together with demand.
- (d) Explain the shape of the AC curve in your graph.
- (e) On your graph, and with math, show how this firm will choose how much output to produce.
- (f) Explain why this firm does not want to sell as much quantity as possible.
2. A competitive market is made up of 100 identical firms. The short-run total cost function of each firm is given by $C = 5q + 0.25q^2 + 100$, where q denotes the output of the representative firm.
- (a) Determine the short-run market supply curve.
- (b) Calculate the price at the market supply is 2000.
- (c) Do you expect the long run equilibrium price in the market to be higher, lower or the same as the price you calculated in part (b)? Explain.

3. The total cost for a perfectly competitive firm as a function of quantity produced, rent and capital used is given by

$$C(q, r, K) = \frac{25q^2}{K} + rK.$$

Find how much capital it is optimal for the firm to use in the long-run period as a function of quantity and rent.

4. Two soft-drink firms, *Rola-Cola* and *Fepsi* operate on a river. *Rola-Cola* is farther upstream, and gets cleaner water, so its cost of purifying water for use in the soft drinks is lower than *Fepsi's* by \$500,000 yearly. You are given no other information about the conditions in the market of soft drinks at that particular location.
- (a) Explain that it is possible for a perfectly competitive market for soft drinks to exist under this scenario.
- (b) Is it possible that the two firms will choose to produce the same amount of soft drink?
- (c) Make an assessment for the cost structure and the profits of the two firms under the assumption that they behave perfectly competitive.

5. A competitive market is made up of 153 identical firms. The total cost function of each firm is given by $C = 1 + 225q^2$. The market demand in this industry is

$$Q = (100 - p) \frac{34}{525}.$$

- (a) Is this a S-R or a L-R cost curve? How do you know?
(b) Calculate the equilibrium in this market.
(c) Find the profit for each firm.
(d) Explain what exactly is going to happen in the L-R.
6. A foreign employee is hired by a Moscow firm and looks for an apartment. The demand curve for housing for this employee is

$$q = 120 - 0.04p,$$

where p is the rent in rubles per m^2 and q is the area in m^2 of housing. The current price in the market is 1000 rubles per m^2 per month. However the firm offers to the employee a company apartment of 50 m^2 for 30,000 rubles a month. Find the employee's CS if she takes the company apartment and if she rents another apartment. What will she do?