

More Practice Problems for Chapters 10-14

A. Perfect Competition and Monopoly

1. If each competitive firm in an industry has the short-run cost function $TC = 50 + 5q + q^2$, and the market price is \$35
 - a. What is the profit-maximizing output level for each firm?
 - b. What is the total revenue and what are the profits?
2. Suppose, in Question 1, fixed costs were \$250 instead of \$50. How does this change affect the firm's output decision and profits? Should the firm continue to operate?
3. What are the conditions for profit maximization for a monopoly? Compare these conditions with those for perfect competition. How do these conditions differ? Look at second order conditions.
4. Understand the effects of taxation on both the perfectly competitive firm and the monopolist. What type of tax affects output? What type of tax does not affect output?

B. Imperfect Competition: A Game-Theoretic Approach

1. Understand the concept of game theory as discussed in class. Be able to define a dominant strategy and Nash equilibrium. Understand the prisoner's dilemma. What is a maximin strategy?
2. What do we mean by a natural monopoly? What factors can account for the existence of a natural monopoly. What would be the socially optimum level of output in this model? What is a compromise solution?
3. Be able to explain the difference between the Cournot Duopoly model and the Stackelberg Leadership model. Be able to do a problem like that shown below.

Suppose that two firms produce steel and that they are the only firms in the market. Their costs are given by $C_1 = 40Q_1$ and $C_2 = 52Q_2$, where Q_1 is the output of Firm 1 and Q_2 the output of Firm 2. Price is determined by the following demand curve:

$$P = 100 - Q \quad \text{Where } Q = Q_1 + Q_2.$$

Find the Cournot-Nash equilibrium. Calculate the profit of each firm at this equilibrium.

4. The market demand curve for a pair of Cournot duopolists is given as: $P = 36 - 3Q$, ($Q = Q_1 + Q_2$). The constant per unit marginal cost is 18 for each duopolist. Find the Cournot equilibrium price, quantity, and profits.
5. Solve Problem 4 as a Bertrand model. Find the long-run equilibrium price, quantities, and profits.
6. Solve Problem 4 as a Stackelberg Leader-Follower model. Assume firm 1 is the leader.

D. Labor Markets

1. You are the manager of a firm producing coffee. The marginal product of labor is

$$MP_L = 72L^{-1/2}$$

Suppose that the firm is a competitor in the coffee market. The price of green coffee is \$1 per pound. Further suppose that the firm is a competitor in the labor market. The wage rate is \$12.00 per hour.

- a. Given the information above what is the marginal revenue product of labor?
 - b. How much labor should the firm hire?
2. Many economists argue that tax cuts will give individuals an incentive to work more; one might argue that the tax cuts will cause individuals to work less. How would the backward-bending supply curve for labor explain both of these arguments?
 3. Suppose a firm has an internal wage structure that can be described by the equation

$$\text{Wage/hr.} = 8 + .2(\text{VMP}_L).$$

Only the workers with a VMP/hr. of _____ will be paid exactly equal to their marginal product. What will these workers be paid?