Handout #1

As explained in the course syllabus, the problem sets are graded based on you turning them in at the due date. They make up a total of 10% of your final grade. For each problem set that you did not turn in we will deduct the according portion from the maximum grade for the 10% of your total grade (e.g. if there are ten problem sets and you have missed two, your grade for the problem set part will be 80 out of 100). You are allowed to work together on the problem sets, but please do not copy from each other. Everyone has to turn in his or her own work in the end.

You are supposed to deliver the problem sets to the EES&OR 341 box in the student mailroom in Terman Engineering, third floor, by 2:30 pm on the due date (15 minutes before class). Turning in late is only acceptable if there is a significant reason that had been announced prior to the due date to oliverth@leland.stanford.edu. It is the student mailroom box where you can also pick up handouts in case you have missed a class.

Oliver's office hours are held on Tuesdays and Thursdays from 12:00 to 1:00 or by appointment (e-mail to oliverth@leland.stanford.edu). The office is in room 493 on the fourth floor of Terman Engineering.

Problem Set 1: Warm-up and Monopoly *(due Monday, April 21)*

Warm-up

1.) A firm faces the following demand curve:

$$P = 100 - 0.01\,Q$$

where Q is the weekly production function and P is price, measure in cents per unit. The firm's cost function is given by:

$$C = 50\,Q + 30{,}000$$

Assuming that the firm maximizes profits:

a.) What is the level of production, price, and total profit per week?

b.) The government decides to levy a tax of 10 cents per unit on this product, to be paid by the firm. What will the new level of production, price, and profit be as a result? What is the new level

of production, price, and profit if the tax is paid by the consumer rather than the firm? (Use graphs to visualize your results! Hint: How do the marginal cost and demand curves change in each case.)

Monopoly I

2.) Consider a monopolist facing the following cost function:

$$C = 35\,Q + 200$$

a.) Calculate the optimal pricing policy given an elasticity of demand $e = 1.5$.

b.) Show algebraically that in a competitive equilibrium price must equal marginal cost by using the elasticity of demand argument.

Monopoly II

3.) A monopolistic firm can identify two classes of its customers. Both have demand functions of the following form:

$$Q = A - B\,P$$

The marginal cost and average cost of producing the product is $5 per unit. However, the parameters A and B differ between these customers, as is shown by the following table:

Customer group	A	B
1	200	2
2	100	4

a.) Assume that the firm cannot price discriminate between the customers. In that case, what is its profit-maximizing price? How much profit will it make?

b.) Assume now that the firm can price discriminate between the two groups of customers, charging separate prices to the two groups. In that case, what is the profit-maximizing price for customer 1 and what is its profit-maximizing price for customer 2? How much profit will the firm make?

c.) For the two cases above (with and without price discrimination), how much loss in consumers' plus producers' surplus will there be if the firm choses profit-maximizing prices? The loss should be measured relative to perfect competition.

d.) In what case - with or without price discrimination - is there more loss in producers' plus consumers' surplus? Given an explanation for your answer.

Monopoly III

4.) Last week, Professor Sweeney explained the concept of market structure and the existence of monopolies. Explain the case of a market that you know either through your own experience or through the press where there exists a monopoly and also explain how the monopolist behaves. Also mention factors that might/ do threaten the position of the monopolist. (Please write not more than half a page.)