Economics 701

Problem Set 11

1. Consider the following demand and supply functions: $Q^{\mathrm{D}} = 1000 - 10P$ and $Q^S = 10 + 200P$.
a) Find the competitive equilibrium price and quantity.
b) Suppose the government imposes a $1 per unit tax on the producer. Using appropriate elasticities, what proportion of this tax will be borne by the consumer? The producer?
c) Find the new equilibrium price that the consumer pays and price that the producer receives. Do your answers accord with what you found in part b?
What is the new equilibrium quantity?
d) Using the standard graph showing supply and demand and the tax wedge, show all values above and the deadweight loss. Compute the value of the deadweight loss from the tax.

2. A monopolist faces demand for its product given by: $P = 50 - 2Q$. The monopolist has total costs given by $TC = 10\ Q$.
a) Solve for the monopoly output, price, and value of profits.
b) Solve for the efficient (competitive) level of output.
c) On one graph, graph demand, marginal revenue, marginal cost, and the monopoly price and output level. Also show the efficient output level and indicate the area representing the deadweight loss.
d) Compute the value of the deadweight loss.
e) Suppose that the government wishes to provide a per–unit subsidy to the monopolist in order to induce the monopolist to produce the efficient level of output. Let the per–unit subsidy be s per unit of output. Note that with the subsidy, the monopolist's demand now becomes: $P = 50 - 2Q + s$. What is the value of s required in order to induce the monopolist to produce the efficient level of output?

3. This question generalizes part e of Question 2 above and is adapted from question 14.8 on page 526 in your text. Suppose the government wishes to combat the undesirable allocational effects of a monopoly through the use of a subsidy.
a) Why would a lump–sum subsidy not achieve the government's goal?
b) Suppose the government wants to induce the firm to produce the efficient level of output. Show (for any general demand and cost curves, $P(Q)$, $C(Q)$, respectively) that, to achieve this goal, the government should set

$$\frac{s}{P^c} = \frac{1}{|e_{Q,P}|}$$

where s is the per–unit subsidy, P^c is the competitive price, and $|e_{Q,P}|$ is the (absolute–value) of the price elasticity of demand. Explain your result intuitively.