Homework 3

1. The cost of producing flat-screen TV’s has fallen over the past decade. Let’s consider some implications of this fact.
   a. Draw a supply-and-demand diagram to show the effect of falling production costs on the price and quantity of flat-screen TVs sold.
   b. In your diagram, show what happens to consumer surplus and producer surplus.
   c. Suppose the supply of flat-screen TVs is very elastic. Who benefits most from falling production costs—consumers or producers of these TV’s

2. There are four consumers willing to pay the following amounts for haircuts
   Jerry: $7   Oprah: $2   Ellen: $8   Phil: $5
There are four haircutting businesses with the following costs:
   Firm A: $3   Firm B: $6   Firm C: $4   Firm D: $2
Each firm has the capacity to produce only one haircut. For efficiency, how many haircuts should be given? Which businesses should cut hair and which consumers should have their hair cut? How large is the maximum possible total surplus?

3. A friend of yours is considering two cell phone service providers. Provider A charges $120 per month for the service regardless of the number of phone calls made. Provider B does not have a fixed service fee but instead charges $1 per minute for calls. Your friend’s monthly demand for minutes of calling is given by the equation \( Q_D = 150 - 50P \), where \( P \) is the price of a minute.
   a. With each provider, what is the cost to your friend of an extra minute on the phone?
   b. In light of your answer to (a), how many minutes would your friend talk on the phone with each provider?
   c. How much would he end up paying each provider every month?
   d. How much consumer surplus would he obtain with each provider? (Hint: Graph the demand curve and recall the formula for the area of a triangle)
   e. Which provider would you recommend that your friend choose? Why?

4. Consider how health insurance affects the quantity of healthcare services performed.
Suppose that the typical medical procedure has a cost of $100, yet a person with health insurance pays only $20 out of pocket. Her insurance company pays the remaining $80. (The insurance company recoups the $80 through premiums, but the premium a person pays does not depend on how many procedures that person chooses to undertake.)
   a. Draw the demand curve in the market for medical care. (In your diagram, the horizontal axis should represent the number of medical procedures.) Show the quantity of procedures demanded if each procedure has the price of $100
b. On your diagram, show the quantity of procedures demanded if the consumers pay only $20 per procedure. If the cost of each procedure to society is truly $100, and if individuals have health insurance as described, will the number of procedures performed maximize total surplus? Explain.

c. Economists often blame the health insurance system for excessive use of medical care. Given your analysis, why might the use of care be viewed as “excessive”?

d. What sort of policies might prevent this excessive use?

5. Evaluate the following two statements. Do you agree? Why or why not?

a. “A tax that has no deadweight loss cannot raise any revenue for the government.”
b. “A tax that raises no revenue for the government cannot have any deadweight loss.”

6. Consider the market for rubber bands.

a. If this market has very elastic supply and very inelastic demand, how would the burden of a tax on rubber bands be shared between consumers and producers? Use the tools of consumer surplus and producer surplus in your answer.
b. If this market has very inelastic supply and very elastic demand, how would the burden of a tax on rubber bands be shared between consumers and producers? Contrast your answer with your answer to part (a).

7. Suppose that the government imposes a tax on heating oil.

a. Would the deadweight loss from this tax likely be greater in the first year after it is imposed, or the fifth year? Explain.
b. Would the revenue collected from this tax likely be greater in the first year after it is imposed, or the fifth year? Explain.

8. Suppose the government currently raises $100 million through a 1-cent tax on widgets, and another $100 million through a 10-cent tax on gadgets. If the government doubled the tax rate on widgets and eliminated the tax on gadgets would it raise more tax revenue than it does today, less tax revenue of the same amount? Explain.

9. This chapter analyzed the welfare effects of a tax on a good. Consider now the opposite policy. Suppose that the government subsidizes a good: For each unit of the good sold, the government pays $2 to the buyer. How does the subsidy affect consumer surplus, producer surplus, tax revenue, and total surplus? Does a subsidy lead to a deadweight loss? Explain.

10. Suppose that a market is described by the following supply and demand equations:

\[ Q^S = 2P \quad Q^D = 300 - P \]

a. Solve for the equilibrium price and equilibrium quantity.
b. Suppose that a tax of \( T \) is placed on buyers, so the new demand equation is:

\[ Q^D = 300 - (P + T) \] Solve for the new equilibrium. What happens to the price received by sellers, the price paid by buyers, and the quantity sold?
c. Tax revenue is \( T \times Q \). Use your answer to part (b) to solve for tax revenue as a function of \( T \). Graph this relationship for \( T \) between 0 and 300.
d. The deadweight loss of a tax is the area of the triangle between the supply and demand curves. Recalling that the area of a triangle is $\frac{1}{2} BH$, solve for deadweight loss as a function of $T$. Graph this relationship for $T$ between 0 and 300. (Hint: Looking sideways, the base of the deadweight loss triangle is $T$, and the height is the difference between the quantity sold with the tax and the quantity sold without the tax.)

e. The government now levies a tax on this good of $200 per unit. Is this a good policy? Why or why not? Can you propose a better policy?