1. The market for pizza is characterized by a downward-sloping demand curve and an upward-sloping supply curve.

a. Draw the competitive market equilibrium. Label the price, quantity, consumer surplus and producer surplus. Is there any deadweight loss? Explain.

b. Suppose the government forces each pizzeria to pay a $1 tax on each pizza sold. Illustrate the effect of this tax on the pizza market, being sure to label the consumer surplus, producer surplus, government revenue and deadweight loss. How does each area compare to the pre-tax case?

c. If the tax were removed, pizza eaters and sellers would be better off, but the government would lose tax revenue. Suppose that consumers and producers voluntarily transferred some of their gains to the government. Could all parties (including the government) be better off than they were with a tax? Explain using the labeled areas in your graph.

If this makes all parties better off, why isn’t it done? Allow the equilibrium price to hold but consumers and producers transfer some of their gains to the government. Difficult to agree on how much to transfer and who among producers and consumers should give what amount. For instance, if consumers agreed to pay a certain amount of their gains from the no tax situation, what would determine which consumers pay how much? It would either have to depend on how much they buy, in which case the payment has the same distorting effect as a tax, or it would depend on the valuation each consumer gets from buying the good. But consumers who buy the good could hide their valuation of the good, saying that their valuation of the good equals the price of the good. Then they would get no consumer surplus from buying the good and would not have to pay anything to the government.

Similarly the amount producers would have to pay would either depend on the amount they sell, in which case it becomes just like a tax (although it may not be a unit tax), or would depend on their individual producer surplus, which depends on their cost. Then firms would have the incentive to hide and overstate their cost so that they don’t have to pay anything. It would be difficult and costly for the government to find out the costs of every firm in the market to make each pay in accordance with its producer surplus.

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

a. "If the government taxes land, wealthy landowners will pass the tax on to their poorer renters."
b. "If the government taxes apartment buildings, wealthy landlords will pass the tax on to their poorer renters."

Answers: a. Unimproved land has a vertical supply curve. The demand for land is downward-sloping. If the government taxes land, the entire incidence of the tax will therefore fall on the landowners. Wealthy landowners cannot pass the tax on to their renters.

b. For rental of apartment buildings, the elasticity of the demand curve may be lower than the elasticity of the supply curve. Then landlords will pass the tax on to their renters.
3. 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."

   What might be a reason for imposing a tax that raises no revenue for the government but has a deadweight loss?

   Answers: a. If either the supply curve or the demand curve is vertical, a unit tax will not create any deadweight loss. But the government will get some revenue. So it is possible for the government to raise revenue from a tax that does not create any deadweight loss.

   b. A tax that raises no revenue for the government could be either a tax of zero or a tax so high that no trade takes place. A tax that is so high that no trade takes place would have a large deadweight loss.

   The government might impose a tax even if it raises no revenue and has a
deadweight loss if it reduces the amount of a good consumed that the government sees as detrimental to society’s well-being, e.g. guns, smoking, drugs.

4. 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. (The total burden on consumers is the difference between consumer surplus before the tax and consumer surplus after the tax. The total burden on producers is the difference between producer surplus before the tax and producer surplus after the tax.

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 in part a.
9. 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 money than today, less money, or the same amount of money? Explain.

Answer: The government gets less revenue than today as long as each of the demand and supply curves has elasticity greater than zero. Revenue equals $Qt$, where $t$ is the size of the unit tax. For revenue to double when tax doubles, $Q$ would need to stay the same. This would only happen when one of the supply or demand curves has zero elasticity. As long as both supply and demand curves have positive elasticity, $Q$ decreases when $t$ rises, so $Qt$ less than doubles when $t$ doubles.