Practice Problems for Quiz 1

1. Use a supply and demand diagram to analyze each of the following scenarios. Explain briefly. Be sure to show how both the equilibrium price and quantity change in each case.

    a) The economic downturn has led to more people staying home to watch movies, rather than go to a movie theater. Show how this change in behavior affects the market for microwave popcorn.

    b) Suppose that drought conditions in agricultural regions increase the costs of irrigation. How would this affect the market for fruits and vegetables?

    c) The *New York Times* recently reported on technological advances leading to an increase in the number of female cows. Female cows are valuable to farmers because they can be used to produce milk. However, while farmers now have more female cows available to produce milk, they are not happy. Use a supply and demand diagram for the milk market to explain why.

2. Suppose that the market for milk can be represented by the following equations:

$$\text{Demand:} \quad P = 12 - 0.5Q_D$$
$$\text{Supply:} \quad P = 0.1Q_S$$

where P is the price per gallon, and Q represents quantity of milk, represented in millions of gallons of milk consumed per day.

    a) Calculate the equilibrium price and quantity of milk.

    b) To help dairy farmers, the government sets a minimum price of $2.50 per gallon of milk. What is the new quantity of milk sold in the marketplace?

    c) Illustrate your answers to (a) and (b) on a graph. Using this graph, calculate how the consumer surplus and producer surplus change after the price supports are enacted. Also calculate any deadweight loss that results.

    d) Suppose that the government supports the $2.50 per gallon price by purchasing any excess milk suppliers make available but are unable to sell to consumers. How much milk must the government buy?

3. From an analytic standpoint, a subsidy is simply a negative excise tax that confers a benefit to certain groups rather than imposing a burden on them. For decades, the federal government has given fairly large subsidies to farmers for producing everything from grain to honey.

    a) Under what conditions of supply and demand would farmers enjoy all the benefits of these subsidies?

    b) Under what conditions of supply and demand would farmers enjoy none of the benefits of these subsidies? Who does benefit from the subsidy in this case?

4. You are the manager of a store that carries generic soft drinks. Due to a local economic boom, your customers' incomes are forecasted to rise by five percent during the next month. The income elasticity of demand for these products is estimated to be –2.0. Estimate the change in the quantity of your soft drink orders required to accommodate the new demand without a surplus or shortage of inventory (that is, how much will demand for the generic soft drinks change due to the increased income?).

5. Concerned about the behavior of his own teenage children, the governor of a large Southern state is considering policy to help reduce consumption of alcoholic beverages. His advisors have suggested a new tax, the Tax Against Beer (TAB). While beer is currently taxed, this tax would increase the overall tax on beer. It would have the effect of raising the price of beer (and thus the tax revenue raised per unit of beer sold) by 10%.

You are given the following information, and asked to calculate the effect of the tax on both consumption of alcoholic beverages and on government revenue.

Price elasticity of demand for alcoholic beverage: -0.4
Number of alcoholic beverages currently consumed per year: 1,000,000

a) By how much will consumption of alcoholic beverages fall after the tax is imposed?
b) Will government revenue increase or decrease after the tax is imposed? How do you know this?
c) How might your answers to (a) and (b) vary if looking at the long-run, rather than the immediate effect?

6. Suppose that demand and supply of apples are described by the following equations:
$$P = 100 - 3Q \text{ (demand)}$$
$$P = 20 + Q \text{ (supply)}$$
a) Calculate the equilibrium price and quantity. Illustrate.
b) Suppose a $4 tax is placed on apples. What is the new equilibrium quantity? How much do consumers pay to get this quantity? How much do suppliers receive for selling this quantity? Show your results on a supply & demand diagram.

7. Suppose the market for cameras has a supply curve of P = 30 + Q, and a demand curve of P = 240 – 2Q. Assume that the market is perfectly competitive.
   a) What will the equilibrium price and quantity of cameras be?
   b) Calculate the producer and consumer surplus associated with the equilibrium found in part (a). Illustrate on a graph.
   c) Suppose the government levies a tax of $18 per camera sold. What is the new quantity of cameras sold? What price do consumers pay? What price do producers receive? Illustrate on a graph.
   d) Find the new producer and consumer surplus associated with your answer to part (c).
   e) How much revenue does the government raise from the tax?
   f) How does the sum of consumer surplus, producer surplus, and revenue after the tax (your answers to (d) and (e)) compare to the sum of producer and consumer surplus found before the tax (your answer to (b))? What does the difference between the two represent?

8. Concerned about the high cost of housing in their city, officials in Busytown solicited ideas to help residents afford new homes. Note that Busytown is a densely populated urban city. It is surrounded by a lake on one side, and mountains on the other, so there is little room to expand. The following suggestions were received:

- Councilman Humperdink notes that the lack of space is a problem. He proposes easing zoning restrictions, so that lots can be subdivided to allow more housing units on existing lots.
- Sergeant Murphy argues that Humperdink's plan will benefit developers, rather than homebuyers. He suggests providing a $10,000 housing subsidy to all Busytown residents, arguing that this extra cash will help them cope with the high cost of housing.

You have been asked by city leaders to evaluate these two proposals.

   a) Using a supply and demand diagram, illustrate the effect of Councilman Humperdink's plan to ease zoning restrictions. Be sure to show both the initial equilibrium and what changes occur after the law is changed. Briefly explain why you have drawn the curves as you did.
   b) Using a second supply and demand diagram, illustrate the effect of Sergeant Murphy's proposed subsidy. Again, be sure to show both the initial equilibrium and what changes occur after the law is changed. Briefly explain why you have drawn the curves as you did.
   c) Based on your analysis, which policy would you recommend? Why?