# Exam #3 (80 Points Total) **Answer Key**

1. (a) Demand increases. Equilibrium price up, equilibrium quantity up.

   (b) Demand decreases. Equilibrium price down, equilibrium quantity down.

   (c) Supply decreases. Equilibrium price up, equilibrium quantity down.

2. The amount that buyers want to buy at the market equilibrium price is equal to the amount that sellers want to sell at that price. At a lower price, buyers want to buy more units than sellers want to sell; this creates incentives that push the price up towards equilibrium. At a higher price, sellers want to sell more units than buyers want to buy; this creates incentives that push the price down towards equilibrium.

3. Below is a hypothetical market for oranges.

P ($/pound)

Q (millions of pounds per day)
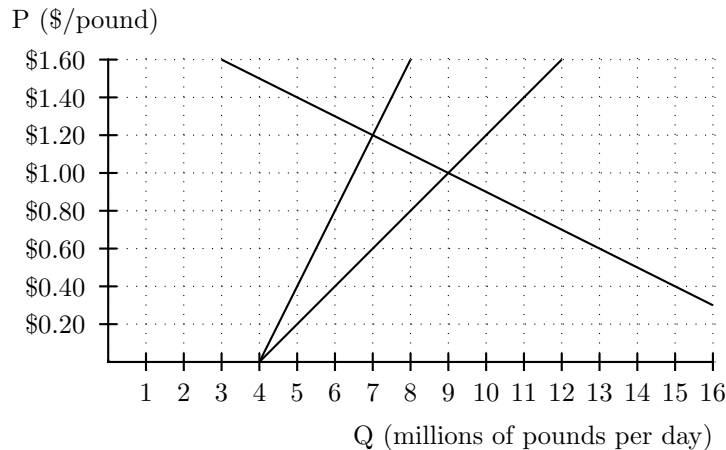
Suppose that the government decides to impose a sales tax of 50% on the sellers of oranges.

   (a) See graph.

   (b) At a price of, say, $.80, sellers actually get to keep $.40 after-tax, so with a market price of $.80 and a 50% tax they should be willing to supply as much as they were willing to supply at a price of $.40 without the tax. Similarly, with a market price of $1.20 and a 50% tax they should be willing to supply as much as they were willing to supply at a price of $.60 without the tax.

   (c) The new equilibrium price is $1.20 per pound. Since buyers paid $1.00 per pound originally, they are paying $.20 more than before.

Sellers used to receive $1.00 per pound; now they receive $1.20, but they pay 50% in taxes, so they effectively receive $.60 per pound. This is $.40 less than before. The ratio of the tax burdens is $\frac{T_B}{T_S} = \frac{.2}{.4} = \frac{1}{2}$.

(d) The price elasticity of supply is about .556; the price elasticity of demand is about -1.111. Their ratio is $-\frac{1}{2}$, which is of the same magnitude as the ratio of the tax burdens!

4. Below is a hypothetical market for oranges.

P ($/pound)

Q (millions of pounds per day)
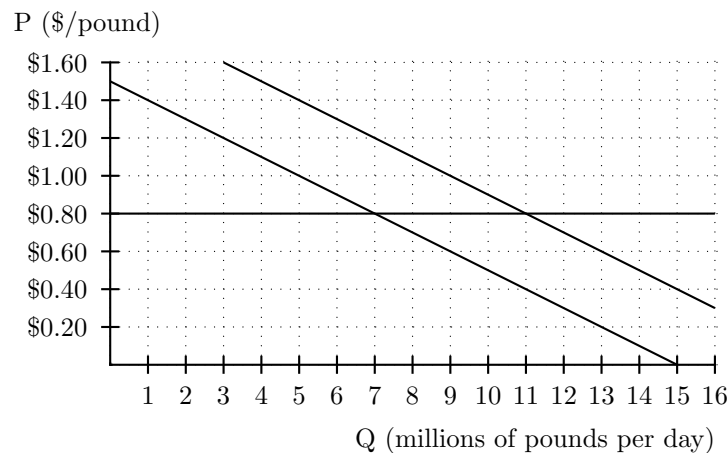
Suppose that the government decides to impose a per-unit tax of $.40 per pound on the buyers of oranges.

(a) See graph.

(b) At a market price of, say, $1.00, buyers have to pay an extra $.40 in tax, so they are effectively paying $1.40 per pound. So they should be willing to buy at a market price of $1.00 with the tax as much as they were willing to buy at a market price of $1.40 without the tax.

Another approach: the marginal benefit curve shifts down by $.40 because the marginal benefit of each unit is reduced by that amount by the tax.

(c) The original equilibrium price, $.80 per pound, is the same as the original equilibrium price. So the sellers receive the same amount per pound both before and after the tax; hence, they bear none of the economic burden of the tax. The buyers must therefore pay all of it: they paid $.80 per pound before the tax, and now pay $.80 per pound to the sellers plus $.40 per pound to the government, for a total of $1.20 per pound. So the buyers bear the entire $.40 tax burden.

(d) The economic incidence of the tax would not change; this is the tax equivalence result. Ultimately, the incidence of the tax is determined by the relative elasticities of the supply and demand curves; the party that bears the brunt of the economic incidence of the tax is that party that is least able to avoid the tax, i.e., the party with the most inelastic curve. Since the supply curve in this problem is perfectly elastic, the buyer will bear the entire economic tax burden, regardless of whether the legal tax burden falls on the buyers or the sellers.

P ($/pound)

Q (millions of pounds per day)
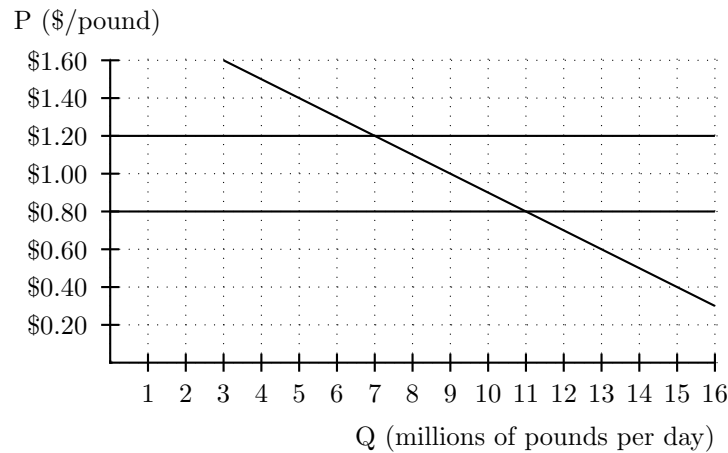
5. The market demand curve is

$$q = 100(30 - 2p) = 3000 - 200p.$$

The market supply curve is

$$q = 100(8p - 5) + 100(10p - 10) = 1800p - 1500.$$

6. (a) Solving simultaneously we get $115 - 10p = 20p - 5$, which yields $p = 4$. Plugging this into either the market demand curve or the market supply curve yields $q = 75$.

   (b) The demand curve is unchanged. The supply curve becomes

$$q = 20(p - .5) - 5.$$

   (c) The supply curve is unchanged. The demand curve becomes

$$q = 115 - 10(1.1p).$$