

EXERCISES CHAPTER 11

Exercise 1. Demand for a good is: $Q_d(p) = 2000 - 30p$. Supply is $Q_s(p) = 10p$.

- (a) Sketch the supply and demand functions. (Be sure to put p on the vertical axis!).
- (b) What is the equilibrium price and quantity? Label them on your graph from part (a).
- (c) What is the consumer surplus?
- (d) What is the producer surplus?
- (e) If the government imposes a tax of \$20 unit, what will happen to the equilibrium price? Including this tax, how much will consumers pay per unit?
- (f) On your sketch from part (a), label the equilibrium quantity after the tax is imposed. Also label the price consumers pay and the price suppliers receive.
- (g) On your sketch from part (a), label the consumer surplus, producer surplus and area of Dead-Weight-Loss after the tax is imposed.
- (h) What is the size of the consumer surplus after the tax is imposed?
- (i) What is the size of the producer surplus after the tax is imposed?
- (j) What is the government revenue of the tax?
- (k) What is the dead-weight-loss associated with the tax?

Exercise 2. Suppose the demand for a good is given by

$$Q_d(p) = 81 - p,$$

and the supply is given by

$$Q_s(p) = 8p.$$

- (a) What is the equilibrium price and quantity for the good?
- (b) What is the elasticity of demand for the good at the equilibrium price?
- (c) What is the elasticity of supply for the good at the equilibrium price?
- (d) Is demand elastic, inelastic, or unit elastic?
- (e) Suppose a tax of \$9 per unit is imposed. What is the new equilibrium quantity?
- (f) Including the tax, how much more do consumers pay per unit compared to the no-tax situation, and how much less do producers receive per unit?
- (g) What is the dead-weight loss associated with this tax?

Exercise 3. Suppose the demand for a good is given by

$$Q_d(p) = 1000 - 8p,$$

and the supply is given by

$$Q_s(p) = 2p.$$

- (a) Find the equilibrium price and quantity in the market.
- (b) What is the consumer surplus in equilibrium with no tax?
- (c) If a tax of $t = 50$ per unit is imposed, what is the new equilibrium quantity?
- (d) What is the government tax revenue?
- (e) If a tax of t per unit is imposed, what is the new equilibrium quantity?

- (f) **(Challenge)** What tax t would maximize government revenue?

Exercise 4. Suppose the demand for a good is given by

$$Q(p) = 400 - p,$$

and the supply is fixed at:

$$Q(p) = 100.$$

- (a) What is the equilibrium price and quantity in the market?
- (b) What is the equilibrium price and quantity if a quantity tax of $t = 200$ is imposed?
- (c) Including the tax, how much more do consumers pay per unit compared to the no-tax situation, and how much less do producers receive per unit?
- (d) What is the dead-weight loss associated with this tax?

Example 5. Suppose the demand for a good is given by

$$Q(p) = 400 - p,$$

and the supply is given by

$$Q(p) = 3p.$$

- (a) What is the equilibrium price and quantity in the market?
- (b) What is the price elasticity of demand at the equilibrium price?
- (c) Given your answer to part (b), if the price were to increase by 1%, approximately what would happen to the quantity demanded?
- (d) What is the equilibrium price and quantity if a quantity tax of $t = 200$ is imposed?
- (e) Including the tax, how much more do consumers pay per unit compared to the no-tax situation, and how much less do producers receive per unit?
- (f) What is the dead-weight loss associated with this tax?