

ECON 3070  
INTERMEDIATE MICROECONOMIC  
THEORY  
Spring 2009, Homework 1

Due Tuesday, Jan. 27 (prior to commencement of the lecture)

*Carefully show how you derive your answer and be sure to interpret your answer where necessary.*

1. Consider a market with (aggregate) demand given by

$$Q^d(p) = a - bp$$

where  $a, b$  are positive constants and  $p$  is the price of the good. Supply on that market is given by

$$Q^s(p) = c + zp$$

where, again  $p$  is the price and  $c, z$  are some positive constants.

- (a) Pick constants  $a, b$  and graph the demand.
- (b) Pick constants  $c, z$  and depict the supply on the previous graph.
- (c) Is there an equilibrium? If so, what is the quantity demanded and supplied and what is the equilibrium price? Demonstrate your answer both algebraically (by solving for equilibrium price and quantity) and graphically (by showing the point corresponding to the equilibrium).
- (d) Find inverse demand function,  $p(Q)$ . Calculate elasticity of demand at the equilibrium point.

- (e) Now increase constant  $a$  in the equation of demand (that could happen if some potential buyers became richer), so that the new demand is

$$\hat{Q}^d(p) = \hat{a} - bp$$

where  $\hat{a} = 1.1a$ . How does the equilibrium price change as a result of this decrease? Will more or less of the good be sold on that market?

2. A monopolist faces direct demand of  $Q^d(p) = 1000 - 20p$ , where  $Q^d(p)$  is quantity demanded at price  $p$ .
- (a) What is the inverse demand function?
  - (b) What is the monopolist's total revenue function?
  - (c) Graph the revenue function,  $R(p) = Q^d(p)p$ .
  - (d) Find the monopolist's choice of price that maximizes total revenue. Use both first and second order conditions. What is the highest revenue the monopolist can get?
  - (e) What is the elasticity of demand at that point?
  - (f) What is the revenue at the point where the demand is unit-elastic?