Professor Joyce Jacobsen

Economics 301-1
Fall Semester 2006-07

Assignment #6

Due Friday 11/3/06 by 6 p.m. in the Econ 301-1 slot in the Economics Alcove

Please show the calculations used to arrive at your answers. Draw graphs neatly and label axes and points clearly. In general, leave numbers in fractional form while solving problems. Round final answers to the first decimal place if necessary.

A. For each case below, draw a graph illustrating the situation and solve algebraically for the supply and demand price(s) and quantity (ies).

(1) Demand: $Q_D = 1000 - 10P_D^2$; Supply: $Q_S = 2P_S^2 - 200$; a minimum price is set of P = $20.

(2) $Q_D = 200 - 4P_D$; $Q_S = 4P_S - 40$; a minimum price is set of P = $20.

(3) $Q_D = 200 - 4P_D$; $Q_S = 4P_S - 40$; a value tax is set of t = 100%.

(4) $Q_D = 200 - 4P_D$; $Q_S = 4P_S - 40$; a quantity subsidy is set of s = $4

B. The market for wudgets is perfectly competitive. There are 100 buyers, each with a demand curve of $q = 50 - 2P$. There are 100 sellers, each with a cost function of $c(q) = q^2 - 50q + 900$. Assume each seller sells the same number of wudgets.

(1) a. What is the market demand curve? Graph it as well as writing down the appropriate algebraic statements.

b. What is the market supply curve? Graph it on the same graph as a. as well as writing down the appropriate algebraic statements.

(2) a. What are the equilibrium price and quantity? Mark this point on your graph from (1).

b. How many units does each buyer purchase? How many units does each seller sell? Does economics tell us how to match buyers and sellers?

(3) a. Calculate profits for a firm. Will there be any exit or entry occurring in this market?

b. If fixed costs rose to 1600, what price would exactly cover costs for this market? How many firms will remain in business if this happens?

(4) Suppose a quantity tax of $1.25 is levied per wudget. Fixed costs are still 900.

a. Solve for the new equilibrium price(s) and quantity.

b. Calculate profits for a firm. Will there be any exit or entry occurring in this market?

C. (1) At Max's Auction House in Middletown, Connecticut, a rare copy of Varian's textbook, first edition, is being sold by auction. There are 5 bidders in attendance: Adrian, Brenton, Charlene, Dipanker, and Justin. The book is worth $100 to Adrian, $20 to Brenton, and $5 to each of the others. The bidders do not collude and they don't know each others' valuations.

a. If the auctioneer sells it in an English auction, who would get the book, and approximately how much would the buyer pay?

b. If the auctioneer sells it in a sealed-bid, second-price auction, and if no bidder knows the others' values for the book, how much should Adrian bid in order to maximize his expected gain? How much should Brenton bid? How much would each of the others bid? Who would get the book, and for how much money?

(2) Late in the day at an antique rug auction, there are only two bidders left, Liz and Greg. The last rug is brought out and the seller says she will accept sealed bids from each bidder and will sell the rug to the highest bidder at the highest bidder's bid amount. Each bidder believes that the other is equally likely to value the rug at any amount between 0 and $1000. Therefore for any number X between 0 and 1000, the probability that the other bidder values the rug at less than X is X/1000. The rug is actually worth $800 to Liz. If she gets the rug, her gain will be the difference between $800 and what she pays for it, and if she doesn't get the rug, her gain will be zero. She wants to make her bid in such a way as to maximize her expected gain.

a. Suppose Liz thinks that Greg will bid exactly what the rug is worth to him. If she bids $700 for the rug, what is the probability that she will get the rug? If she gets the rug for $700, what is her gain? What is her expected gain if she bids $700?

b. Again suppose that Greg will bid exactly what the rug is worth to him. If Liz bids $600 for the rug, what is the probability that she will get the rug? If she gets the rug for $600, what is her gain? What is her expected gain if she bids $600?

c. Again suppose that Greg will bid exactly what the rug is worth to him. If Liz bids $x for the rug (where $x is between 0 and $1000), what is the probability that she will get the rug? If she gets the rug, what is her gain? Write a formula for her expected gain if she bids $x. Find the $x that maximizes her expected gain. [hint: take a derivative]

d. Let us go a little further toward finding a general answer. Suppose that the value of the rug to Liz is $V and she believes that Greg will bid exactly what the rug is worth to him. Write a formula that expresses her expected gain in terms of the variables V and x if she bids $x. Now find the $x (as a function of V) that maximizes her expected gain. [same hint]

D. Write a short (under one page) essay on one of the following topics: <u>Use the topic that corresponds to the first letter of your last name</u>. Include clearly-drawn graphs when they are useful in illustrating your points. Think about the most important and most likely consequences of the policy.

(1) Congress passes a law stating that all persons with last names beginning with A-E are subject to a minimum wage of $10/hour; for all other persons the minimum wage is abolished. Discuss the short and long–run effects of this policy.

(2) Congress passes a law giving all persons with last names beginning with F-L a housing subsidy of 25% of their rent or mortgage payments. Discuss the short and long–run effects of this policy.

(3) Congress passes a law subjecting all persons with last names beginning with M-Q to a wage tax of 25%. Discuss the short and long–run effects of this policy.

(4) Congress passes a law prohibiting all persons with last names beginning with R-Z from working more than twenty-five hours a week for pay. Discuss the short and long–run effects of this policy.