U8213 Colloquium on Policy Analysis Section 3
Spring 2001
Problem Set 3: Auctions and bidding

1.   You know for certain that only the General Statics Corporation has the secret of producing the left-handed reverse widgets that you must procure for the Defense Department. You don't know what their costs are. However, you can guess that the probability is $^1/_3$ that costs are $89, $^1/_3$ that their costs are $49, and $^1/_3$ that their production cost is $9. If you cannot make the purchase from them, then the Defense Department will have to retrofit a right-handed widget at a cost of $100 a piece.

        The contract for left-handed reverse widgets must be competitively bid. You are allowed to state in the specifications the maximum allowable bid that you will accept. The maximum allowable bid must be a whole number. General Statics will bid if and only if it makes a profit. Find the maximum allowable bid that minimizes the expected cost to the Defense Department (being fearless, the Defense Department is risk neutral).

2.   Suppose you have chosen the optimal maximum allowable bid in question 1. What is the probability that General Statics does not bid? What is the best thing for you to do then?

3.   Suppose General Statics has two competitors, Lockjaw and McDonald's-Douglas. Also assume that you are not allowed to set a maximum allowable bid. You figure that each has the same probability distribution of costs as General Statics and that their costs are independent of each other (i.e., no matter what Lockjaw's costs are, the probability that it costs McDonald's-Douglas $9 to make the widget is still $^1/_3$).

        a.   Suppose you hold a Vickrey auction (sealed bids, contract awarded to lowest bidder at second-lowest price). What is the expected cost?

        b.   Suppose you hold an English auction. What is the expected cost?

4.   The English auction starts in 15 minutes. General Statics and Lockjaw have representatives present. You get a phone call from the McDonald's-Douglas representative. She says she has spent all her money on cheeseburgers and cannot afford the $6 cab ride to your office. She will come only if you pay her way. Should you?