**MICROECONOMIC THEORY (ECON 713)**
**UNIVERSITY OF WISCONSIN-MADISON, PROF. MARZENA ROSTEK**

**MIDTERM**
April 16, 2009

Time: **75** minutes
Number of questions: **3**
Number of points: **28**
Rules: **Closed-book** exam

**Good luck!**

**Question 1: [15 points] An All Pay Auction**
Consider an IPV "all pay" auction with I bidders: bidders place their bids simultaneously; the bidder with the highest bid wins, and each bidder pays the amount he bid whether or not he wins. The valuation $v_i$ of every bidder is drawn from a distribution $F()$ with a strictly positive density $f()$ on the support [0,V]. Find the *symmetric* pure-strategy BNE in *strictly increasing* strategies. Make sure to verify that the equilibrium bids you found are symmetric and strictly increasing.
Please note that the question is asking you to derive equilibrium explicitly, and not using the Revenue Equivalence Theorem, for example.
**Hint**: You can assume that the optimal bid for a bidder with valuation 0 is 0.

**Question 2: [10 points] A Hybrid Auction**
A sculpture is auctioned away to I bidders who have independent private values, each of which is drawn from the uniform distribution over [0, 1]. The auction works as follows: each bidder submits a sealed bid. The auctioneer opens the envelopes and allocates the object to the highest bidder. He then flips a fair coin - if it shows head the winning bidder has to pay his own bid; if it shows tail the winning bidder has to pay the second highest bid. The auction is therefore a mixture between a sealed bid-first price and second price auction.

(a) Find the expected payment of an agent with a valuation $v$ in a second-price auction.
(b) Assume that in the hybrid auction agents bids are linear functions, i.e. $b(v)=cv$ for some $c<1$. *Applying the Revenue Equivalence Theorem*, solve for the symmetric bidding functions in the hybrid auction. Compare it with the bid in the FPA and the SPA.

**Question 3: [3 points] A Short Question**
Concisely explain the relation between axiomatization and identification.