

ISYE 6230 - Economic Decision Analysis II
Spring 2004
BONUS - Due March 16, 2004, 12:05 PM

We will select only one of the following problems and grade it, and the points you earn will be added as BONUS to your homework. It is encouraged that you work on these problems to “practice” for the test and to earn bonus points.

1. (12 points) Suppose there are two firms in an industry that act as Cournot competitors. Firm 1 has constant per unit costs of 12. Firm 2 can have either high constant per unit costs of 24, or low constant per unit costs of 12. Assume that the probability of high and low costs are each 0.5. Firm 2 knows whether it has high or low cost but firm 1 does not. The inverse industry demand curve is $P(Q) = 72 - Q$, where $Q = q_1 + q_2$, and q_i is the output of firm i , $i = 1, 2$.

- a) Find the expected profit (in equilibrium) for firms 1 and 2 when information about firm 2s costs is private information.
- b) Find the expected profit (in equilibrium) for firms 1 and 2 when information about firms 2s cost is known by both firms prior to production.
- c) Compare the answers in parts (a) and (b). Is it better for firm 2 to keep information private or to reveal information?

2. (10 points) Find all pure strategy Bayesian Nash Equilibria in the following static Bayesian game:

- (i) Nature determines whether the payoffs are as in Game 1 or as in Game 2, each game being equally likely
- (ii) Player 1 learns whether nature has drawn Game 1 or Game 2, but player 2 does not.
- (iii) Player 1 chooses either T or B; Player 2 simultaneously chooses either L or R.
- (iv) Payoffs are given by the game drawn by nature.

		Game 1		Game 2	
		Player 2		Player 2	
		L	R	L	R
Player 1	T	(1,1)	(0,0)	(0,0)	(0,0)
	B	(0,0)	(0,0)	(0,0)	(2,2)

3. (10 points) Consider a first-price sealed bid auction in which the bidders’ valuations are independently and uniformly distributed on $[0,1]$. Show that if there are n bidders, then the strategy of bidding $(n - 1)/n$ times one’s valuation is a (symmetric) Bayesian Nash equilibrium in this auction.