

## PROBLEM SET 3

### Econ 250

1. *Differentiated Bertrand Competition.* There are two firms  $i = 1, 2$  simultaneously choosing prices  $p_i \in [0, 1]$ . The demand of firm  $i$  is  $D_i(p_i, p_{-i}) = 1 - 3p_i + p_{-i}$  and it has zero production costs. That is, firm  $i$ 's payoff is  $p_i D_i(p_i, p_{-i})$ .
  - (a) Find the best response function of firm  $i$ .
  - (b) Find the set of 1-rationalizable, 2-rationalizable and 3-rationalizable strategies.
  - (c) Find the unique PSNE.
2. Consider the following Guessing Game. There are  $n = 10$  players simultaneously choosing a number in  $\{1, 2, 3\}$ . The winners are those closest to  $1/2$  the average guess (they evenly split the prize between the winners if there is more than one). Find the set of rationalizable strategy profiles. Justify your answer.