

## Midterm Exam: Economics 101

You have one hour and fifteen minutes. Do all 3 questions; each have equal weight. Use two bluebooks. Put the answers to questions 1 and 2 in one bluebook, and the answer to question 3 in the other. You will get credit only if you provide a clear explanation of your answer and how you got it Good luck.

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### 1. Short Answers

For each of the normal form games below, find all of the Nash equilibria. Which are Pareto Efficient?

a)

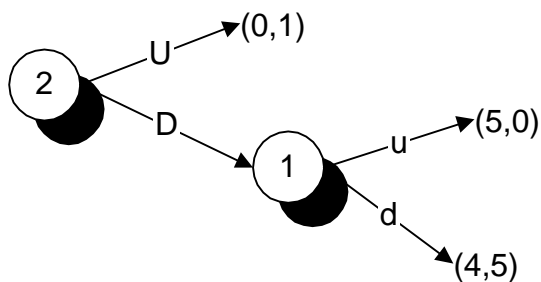
	L	R
U	2,2	1,6
D	6,1	0,0

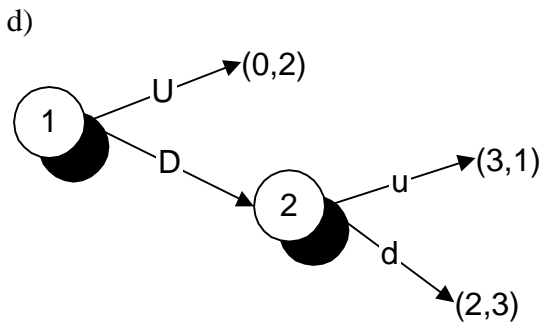
b)

	L	R
U	5,5	6,0
D	0,3	7,5

For each of the extensive form games below, find the normal form and all Nash equilibria. Then find all of the subgame perfect equilibria. Which are Pareto Efficient?

c)





## 2. Cournot Duopoly with Differential Marginal Cost

Big bad Bill can produce computer software for a unit cost of \$1, while it costs sad sorry Steve \$3 per unit of software. Software produced by Bill and Steve are perfect substitutes and the inverse demand for software is given by  $p = 17 - x$ . In the Cournot equilibrium, what is the price, how much does the industry produce, how much does each firm produce and how much profit does each firm receive?

## 3. How to get a job?

Ms. B. C. Barbara must decide whether to work hard in kindergarten, or to have fun. Working hard yields no utility, while having fun gives 10 units of utility. Later in life, MBCB must decide between seeking employment as a stockbroker or working as a hamburger flipper. A hamburger flipper gets no utility, but does get a job for sure, and the game ends. So, for example, working hard in kindergarten and working as a hamburger flipper gives no utility, while having fun and becoming a hamburger flipper gives a utility of 10. Seeking employment as a stockbroker is a different matter; chief recruiter J.G. Soroso must decide whether or not to give MBCB a job or not. However, JGS doesn't know whether or not MBCB worked hard in kindergarten or not. If she did and JGS gives her a job, JGS gets a utility of 1; if she did not work hard in kindergarten and JGS gives her a job, JGS loses his own job, and gets a utility of  $-1$ . If no job is given JGS gets no

utility. Meanwhile, if MBCB gets the job, it is worth 20 units of utility (in addition to any utility from having fun in kindergarten).

- a) Find the extensive form of this game.
- b) Find the *reduced* normal form of this game. Find all Nash equilibria of this game.
- c) Which of the Nash equilibria are Pareto Efficient and which are not?
- d) Apply the theory of iterated weak dominance to this game.