FINAL EXAM
Econ 4011, Spring 2012

Do all questions. The questions have equal weight. You have 1hr and 53minutes.

1. Mixed Strategy Equilibrium

Consider the following simultaneous move game.

	L	R
U	20, 40	0,60
D	10,50	30,10

Ann is the row player while Bob is the column player.

a) Does this game have any pure strategy equilibria? If yes then state all of them.
b) Does this game have any mixed strategy equilibria? If yes then state all of them.

2. Drilling for Oil Again

A firm called GP needs to decide whether to drill for oil or not on a particular tract of land. The cost of drilling is 50 while the value of such drilling would be 200 if oil was indeed present and 0 otherwise. GP simply knows that the bed has an equal (50%) chance of being dry or wet.

GP *could* make use of a geological survey prior to its decision to drill. It is commonly known that the survey has an error rate of 10% if the bed is wet (oil truly present) and an error rate of 30% if the bed is dry.

a) Suppose GP uses the survey;
   i) If the survey returns a positive signal that oil is present, what probability would GP attach to the bed truly being wet?
   ii) Given such a probability assessment would GP choose to drill?
   iii) Would GP choose to drill if it received a negative signal?
   iv) What probability does GP attach to getting a positive signal? (careful here)

b) What is GP's expected payoff from using the survey (before knowing the signal)?

c) What is GP's expected payoff from making the drilling decision without using the survey?

d) At what price, if any, would GP be willing to use the survey?

3. Optimal Manager Compensation

You own a winery and design an incentive contract for your manager. The winery will either go belly-up yielding a payoff of zero, or it will yield a profit of 1. You are risk neutral. There are two types of managers: competent managers and incompetent managers. If the manager is competent there is a probability ¾ of a profit; if the manager is incompetent there is a probability ¼ of a profit. The manager is risk averse and has utility for income w given by $w - w^2/2$ (for $w < 1$). The manager has an outside opportunity worth ¼ as income (wage): if he does not

receive the equivalent of that amount in expected utility he will not work and there will be no profit. Managers know their types and are asked to reveal it. Call the announced type t . Suppose that you offer a contract in which anyone claiming to be an incompetent manager is paid ¼ regardless of output, and that you offer to pay a competent manager w_0, w_1 where w_0 is the payment if the firm fails and w_1 is the payment if the firm turns a profit. For legal reasons these must both be non-negative – the manager cannot be required to pay you.

a. What is the incentive constraint for the competent manager?

You may assume that the incompetent manager cannot pretend to be competent.

b. What is the individual rationality constraint for the competent manager?

c. What contract should you offer the competent manager?