Economics 204 B Winter 2014
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Midterm Exam

Instructions. In class, 105 minutes, closed book except for official cheat sheet. Partial credit will be granted for brief, relevant remarks and for partial results -- if you get tangled in algebra somewhere, at least tell me what you know. When information is insufficient, please write down a reasonable assumption and proceed. Points as marked; total is 50.

1. Consider the two player game described by the following payoff bimatrix.

	a	b	c
A	3,4	4,2	7,0
B	1,5	5,6	3,1
C	2,1	3,3	6,2

   a. Does either player have a dominant strategy? (1 point)
   b. Does either player have a dominated strategy? (1 point)
   c. Which strategy profiles survive iterated deletion of strictly dominated strategies? (2 points)
   d. Find all Nash equilibria (NE) in pure strategies, if any. (2 points)
   e. Find all Nash equilibria (NE) in mixed strategies, if any. (2 points)

2. Consider the Bernoulli function $u(x) = \ln(10+x)$. Compute the coefficient of absolute risk aversion and the coefficient of relative risk aversion. (4 points)

3. You are considering buying a zinc mine. It will cost $2 (million) to bring it into production; other costs are negligible. Revenue (in present value terms) will be either $10 (probability = .5) or zero (probability = .5). Assume for now that you will have to sink the $2 cost before acquiring any more information on revenue.
a. If you were risk neutral, what would be your maximum willingness to pay (WTP) for the mine? (3 points)
b. Now suppose that your Bernoulli function is $u(x) = \ln(10+x)$. What are your WTP and your risk premium? Hint: is WTP related to certainty equivalent (CE)? (4 points)
c. For the rest of this problem, assume again that you are risk neutral. Suppose that you can hire a perfect expert who can tell you for sure whether revenue will be 10 or zero. What is your WTP for the perfect expert if the price of the mine is $4? (3 points)
d. Assume now (as seems realistic) that no perfect expert can be found, but there is an imperfect expert who correctly forecasts the revenue 90% of the time. What is your WTP for this expert if the price of the mine is $4? (6 points)
d. Finally, assume that no experts are available but you can defer the $2 cost until after purchasing the mine and after determining the revenue. What is your WTP for the mine? (4 points)
e. [extra credit.] Combine parts b and c: what is your WTP for a perfect expert if you have the Bernoulli function given? Is it more or less than if you were risk neutral?

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4. The professor of a Monday-Wednesday class announces that she will give a quiz some day next week, but the particular day (M or W) will be a surprise. A student argues that surprise is impossible: if the quiz is on W, it will not be a surprise since no other options remain. So it can't be W. But now M won't be a surprise either, since W has been ruled out. The student concludes that there will be no exam and doesn't study. [Here's what actually happened. The professor gave the quiz on Monday and the student was unpleasantly surprised!] For many years, philosophers and logicians have puzzled over this apparent paradox (though usually they talk about versions longer than 2 days). To resolve the paradox,

a. write out a two player extensive form game (EFG) in which player #1, the Professor (P), chooses the day in advance, and player #2, the Student (S), guesses each day before class whether or not the exam is today (T) or later (L). Say the payoff is +1 to S and -1 to the P each time the student guesses correctly, and is the opposite each time S guesses incorrectly. For example, if the exam is on W and the student guessed T on both M and W, then P's payoff is 1-1=0 and S's payoff is -1+1=0. (6 points)

b. write out the sets of pure strategies for both players, and the normal form game (NFG) bimatrix. (4 points)

c. find all pure strategy Nash equilibria of the game (or show that none exist), using the bimatrix. (4 points)

d. find all mixed strategy Nash equilibrium of the game, or show that none exist. (4 points)

e. for extra credit, write out the EFG for the 3 date version (MWF class). If you have time to kill, find all NE for this game.

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