EC 501: Problem Set 8
(Due in class on Tuesday, November 5)

1. Liz Baylor has a $100,000 ring and keeps $100,000 cash in a checking account that pays no interest. If the ring is stolen, Liz will be forced to replace it at a cost of $100,000. The chance of this happening is 1/100. She can, however, get insurance that would completely reimburse to her the $100,000 if her ring <u>was</u> stolen.

    What is the largest premium she would be willing to pay if her U-function is :
    (i) $U = Y^{1/4}$
    (ii) $U = Y^4$
    (iii) $U = Y$?
    where Y denotes the amount of cash she has. (Note that her utility function does not include the value of the ring, since she always has the ring.)

2. Wildcat Co. has to decide whether or not to drill an oil well. It has $100 current income. Drilling would cost $100; if oil were struck, the company would receive $200 for the oil. If the field is dry, nothing is recovered.

    (a) Suppose Wildcat's U-function is U=y where y is income. Suppose the probability of striking oil is 0.6. Should Wildcat drill? At what probability would Wildcat be just indifferent between drilling or not?

    (b) Now suppose the U-function is $U=2y^{1/2}$. Is Wildcat risk averse? Using this function, answer question (a).

    (c) Suppose for $20, Wildcat could run a test that would determine for <u>certain</u> whether the field is wet or dry. The probability of a positive test is .6. Would the Wildcat with utility as in (a) do this test? (Assume that if the field <u>is</u> wet, they can borrow at zero interest the extra $20 needed to drill - to be repaid immediately.) What is the maximum amount Wildcat would pay for the test?

    (d) Answer (c) using $U = 2y^{1/2}$. For which U-function does the company value the test higher? Offer an explanation for your answer.

3. J.R. Ewing, a Texas oil driller, estimates his present wealth to be $20 million. He obtains a lease to drill in Dallastown, where he estimates that the cost of drilling will be $10 million, and there is a 20 per cent chance that oil valued at $100 million will be discovered.

    (i)   What is the expected net gain of drilling in Dallastown?

    (ii)   If J. R.'s utility function is
              $U(W) = \ln W$
    where W is his wealth in millions of dollars, will he undertake to drill?

    (iii)   J.R.'s brother, Bobby, learns about the lease that J.R. has obtained and tries to persuade him to let him have a 50% share in the venture. That is, Bobby asks that he be allowed to get half the oil revenues in exchange for putting up half the money needed to drill. Will J.R. let Bobby into the deal? What principle of the economics of uncertainty does your answer illustrate?