

## Problem Set 9

1. A decision maker with utility  $u(\cdot)$  of income wants to compare three lotteries:

	State 1	State 2	Probability of State 1
Lottery 1	4	16	1/2
Lottery 2	1	25	5/8
Lottery 3	10	0	1

- a) Which lottery is preferred by a risk-loving, risk-neutral or risk-averse decision-maker, respectively, and why?
  - b) For  $u(x) = x^{1/2}$  and  $u(x) = x^2$  calculate and compare the certainty equivalent and risk premium of each lottery.
2. Your utility function is given by  $U = \ln(4C)$ , where  $C$  is consumption. You make 30 000 per year but you have a 5% chance that next year you will face a health problem and lose a total of 20 000 (in medical costs and loss of labor income).
- a) Suppose you can buy insurance. How much does a unit of insurance cost if the insurance is actuarially fair? How much insurance would you buy in this case?
  - b) What is the maximum amount that you would be willing to pay for full insurance?
3. A traffic department is responsible for enforcing parking regulations in the business section of a large city. There is a constant probability  $p$  that an illegally parked car will be ticketed on any given day. Each driver had the choice of parking legally at  $\$X$  per day, or illegally, paying a fine of  $\$F$  each day his car is ticketed. Assume that all drivers are identical in all relevant respects and act to maximize expected utility.
- a) Suppose that the aim of the traffic department is to discourage illegal parking. If all drivers have constant marginal utility of income, what is the minimum fine  $F$  that the traffic department should impose, in order to achieve this aim?
  - b) Suppose now that all drivers have diminishing marginal utility of income and experience neither utility nor disutility from obeying the law. How does this affect your answer to (a)? What if all drivers have increasing marginal utility of income?