IE 444 Operations Research in Finance
Fall 2005
Homework III, due: 13.10.2005

1. A person has \$10000 in her bank account and a car that is worth \$2100. With probability $P = 0.1$ her can be stolen. She has a utility function for valuing wealth given by $u(x) = \sqrt{x}$, where x represents wealth.

a. What is her expected wealth?

b. What is her expected utility derived from wealth?

c. Is the person risk averse or risk taker? Justify your answer rigorously using Jensen's inequality.

d. This person can buy an insurance policy against car theft. The insurance company offers to pay her $c = \$2100$ if her car is stolen (the company can certify that the car has indeed been stolen) in exchange of a payment p that is to be paid by the person upon purchase of the insurance policy. The amount p is known as the *insurance premium*.

How much should she be willing to pay for this insurance policy?

Hint: To solve the problem, find the value of p that leaves indifferent between having insurance and not having insurance. You have to do this using expected utility values with and without insurance.

e. Suppose that the insurance company is risk neutral. I.e., the company decides based solely on expected profit. Find the company's expected profit using your answer to part c. Should the company offer the insurance for the price you found in part c.?