1 Question 1: MWG 6.C.1

Consider the insurance problem studied in example 6.C.1. Show that if insurance is not actuarially fair (so that $q > \pi$), then the individual will not insure completely.

2 Question 2: MWG 6.C.2.a

Show that if an individual has a Bernouilli utility function $u(\cdot)$ with quadratic form

$$u(x) = \beta x^2 + \gamma x$$

then this utility from a distribution is determined by the mean and the variance of the distribution and in fact by these movements alone. Note: the number β should be taken to be negative in order to get concavity of $u(\cdot)$. Since $u(\cdot)$ is then decreasing at $x > -\frac{\gamma}{2\beta}$, $u(\cdot)$ is useful only when the distribution cannot take values larger than $-\frac{\gamma}{2\beta}$.

3 Question 3: MWG 6.C.12

Let $u : \mathbb{R}_+ \to \mathbb{R}$ be a strictly increasing Bernouilli utility function. Show that:

a) $u(\cdot)$ exhibits constant relative risk aversion equal to $\rho \neq 1$ if and only if $u(x) = \beta x^{1-\rho} + \gamma$, where β is positive if $\rho < 1$ and β is negative if $\rho > 1$ and $\gamma \in \mathbb{R}$.

b) $u(\cdot)$ exhibits constant relative risk aversion equal to 1 if and only if $u(x) = \beta \ln x + \gamma$, where $\beta > 0$ and $\gamma \in \mathbb{R}$.

c) $\lim_{\rho\to 1} \frac{x^{1-\rho}-1}{1-\rho} = lnx \quad \forall x > 0$.

4 Question 4: MWG 6.C.13

Assume that a firm is risk neutral with respect to profits and that if there is any uncertainty in prices, productions decisions are made after the resolution of such uncertainty. Suppose that the firm faces a choice between 2 alternatives. In the first, prices are uncertain. In the second, prices are nonrandom and equal to the expected price vector in the first alternative. Show that a firm that maximises expected profit will prefer the first alternative over the second.