ECON 8002/4162: Microeconomic Analysis
PROBLEM SET #1
(due in the TA session, 11/1)

1. Varian, 11.2

2. Varian, 11.4

3. Suppose that if an individual lives for exactly T years and then dies he gets to consume $\{c_t | t = 0, 1, 2, \ldots, T\}$. Assume that the expected utility function u can be written in the additively separable form

$$u(\{c_t\}_{t=0}^{T}) = \sum_{t=0}^{T} \beta^t U(c_t). \tag{1}$$

   The parameter β is called the discount factor. Assume that the individual's lifespan has a probability distribution, $\Pr[T = x] = \lambda(1-\lambda)^x$ for any $x = 0, 1, 2, \ldots$.

   (a) What is the life expectancy of this individual? What is the probability that he lives to at least t?

   (b) Explain the sense in which the individual gets a lottery. Write it as a lottery with two outcomes, one of which is c_0.

   (c) Show that the expected utility of this individual's lottery can be written in the form of equation (1) but with some term B in place of β. Show how B depends on both β and λ. Explain the intuition.

   (d) Given all the assumptions above, consider an individual whose life expectancy is 60 years, whose discount factor is 0.97, and for whom $U(c) = \ln c$. Would he prefer $\{c_0 = 10, c_1 = 10, \ldots, c_{60} = 10, c_{61} = 5, c_{62} = 5, \ldots\}$ or $\{c_0 = 8, c_1 = 8, \ldots\}$?