ECONOMICS 311: Intermediate Microeconomic Theory
ASSIGNMENT 4

Answers to this assignment are due back by Friday, February 17, 2016.

1. Question 3 from Assignment 3

Please complete question 3 from Assignment 3.

2. Bets

You have to accept one of the following bets:

   1. Win $200 with probability ½, lose $200 with probability ½.
   2. Win $200 with probability ¾; lose $600 with probability ¼.
   3. Win $200 with probability 0.9; lose $1,800 with probability 0.1.

   a. Show that each of these is a fair bet.
   b. Graph each bet on a utility-of-income curve (that shows diminishing marginal utility).
   c. Which bet will be preferred? Why?

3. Insurance

You are risk averse. You have a current wealth of $50,000. There is an even chance that you will fall on the ice tomorrow and break a leg, causing you to suffer a loss of $25,000.

   a. Company A will provide actuarially-fair insurance against the losses due to slipping on ice. Calculate the cost of the insurance. On an appropriate diagram, show that you would be willing to pay for the insurance at this price.
   b. Company B will provide actuarially fair insurance that will cover half of any loss incurred. Would you prefer this insurance policy to that proposed by Company A? Explain.
   c. Suppose that if you only insure for half the losses (as with Company B), you will take greater care not to hurt yourself so badly, and the loss if you slip on the ice would be just $17,500. In this case, what will be the price of an actuarially fair policy? Explain why some individuals may now prefer this type of policy, and illustrate your answer with an appropriate graph.

4. Utility and Insurance

You are planning to visit Timbuktu, and you expect to spend $10,000 (on travel, souvenirs, camel rides, and the like). Your utility function is given by \( U(Y) = \log_{10} Y \), where \( Y \) is the amount you spend.

   a. There is a 25% probability that you will lose $1,000 on the trip – your wallet falls out of your pocket while you are on the camel. What is the expected utility of the trip?
   b. You can buy actuarially fair insurance against losing the money. Show that you will want to buy this insurance.
   c. What is the maximum you would be willing to pay to insure against the possible loss of the $1,000?
   d. Unfortunately, people who buy insurance may become careless; with insurance, the probability that you will lose the money rises to 30%. Will you buy actuarially fair insurance in this case? Explain.
5. Probabilities

Lucky you! You have been selected to play on a TV game show. The presenter shows you three doors, which we will label A, B, and C. Behind one of them is a beautiful car, and behind the other two are goats (which don’t interest you at all), but of course you don’t know which door hides the car. You are asked to choose one of the doors, and you choose door C. Then the presenter tells you that the car is not behind door A, and gives you another chance: you can stay with your choice of C, or switch your choice to B. What should you do, given that you really want that car? Explain your reasoning.

6. Certainty equivalents

You have an income (I) of $50,000. You have made a bet with your rich uncle about the outcome of a football match; if you win, you get $5,000, but if you lose you pay $5,000. The probability of winning is 50%.

a. Calculate the certain income that would give you the same utility as this bet, assuming that your utility is given by $U(I) = \sqrt{I}$.

b. Repeat a., but this time assume $U(I) = -\frac{1}{I}$.

c. Repeat a. again, but now assume $U(I) = \ln(I)$.