**NTU SSS Economics HE2001**  
**Tutorial 7 (Welfare Measures)**

1) Tom has a quasi-linear utility function . Illustrate in a diagram how for any price increase of good , compensating variation equals to equivalent variation.

*Note: for the shape of the utility function, you can take the indifference curves to be similar to that which we drew in the lecture.*

2) Bernice’s preferences can be represented by ,where is pairs of earrings and is dollars to spend on other things. She faces prices and her income is 12.

(a) Draw in a graph, her budget constraint and several indifference curves, illustrating the optimal bundle.

(b) The price of a pair of earrings rises to $3 and Bernice’s income stays the same. On the same graph, draw her new budget constraint, illustrating the optimal point.

(c) What bundle would Bernice choose if she faced the original prices and had just enough income to reach the new indifference curve in (b)? Draw a budget line which passes through this bundle at the original prices. What is the level of income Bernice has at this new budget line?

(d) What is the equivalent variation (EV) of the price increase in earrings from $2 to $3 ?  
Remember that EV is the maximum income that at the original prices, when removed, just gives the consumer the same final utility level.

(e) What bundle would Bernice choose if she faced the new prices and had just enough income to reach the original indifference curve in (a)? Draw a budget line which passes through this bundle at the new prices. What is the level of income Bernice has at this budget line?

(f) What is the compensating variation (CV) of the price increase in earrings from $2 to $3 ?  
Remember that CV is the least income that at the new prices, when given, just restores the consumer’s original utility level.

3) Steve consumes earplugs and other goods. His utility function is increasing in both his consumption of earplugs and other goods . Suppose that Steve has a sufficiently large wealth .

1. Suppose and that Steve can buy units of earplugs at total cost .
2. Write out Steve’s utility of consuming units of earplugs and spending the rest on other goods.
3. Suppose that the earplug costs , write out Steve’s utility of consuming units of earplugs and spending the rest on other goods.
4. Show that the reservation price for the earplug is .   
   (Hint: look at the definition of the reservation price.)

*Note that this implies that if earplugs were perfectly divisible, the reservation price function .*

1. Solve Steve’s utility maximisation problem (subject to prices and wealth to get his inverse demand function for earplugs . Is it the same as the reservation price function?
2. In the lecture’s example, and such that the reservation price curve is . What do you think the additional term captures?

4) Lolita, an intelligent and charming Holstein cow, consumes only two goods, cow feed (made of ground corn and oats) and hay. Her preferences are represented by the utility function , where is her consumption of cow feed and is her consumption of hay. Lolita has been instructed in the mysteries of budgets and optimization and always maximizes her utility subject to her budget constraint. Lolita has an income of that she is allowed to spend as she wishes on cow feed and hay. The price of hay is always $1, and the price of cow feed will be denoted by , where .

1. Write Lolita’s inverse demand function for cow feed.
2. If the price of cow feed is and her income is , how much hay does Lolita choose?
3. Plug these numbers into her utility function to find out the utility level that she enjoys at this price and this income.
4. Suppose that Lolita’s daily income is $3 and that the price of feed is $0.50. What bundle does she buy? What bundle would she buy if the price of cow feed rose to $1?
5. Suppose that Lolita could pay a fee to avoid the price increase. What is the largest fee Lolita be willing to pay to avoid having the price of cow feed rise to $1? Is this EV or CV?
6. Suppose that the price of cow feed rose to $1. How much extra money would you have to pay Lolita to make her as well-off as she was at the old prices? Is this EV or CV?
7. What is the change in consumer surplus of the price increase of cow feed from $0.5 to $1?

**Sample Questions (No solutions will be provided for these)**

1) There are two types of fruits grown for consumption in Fruitland, A and B, with initial prices and respectively. Due to climate change, a recent drought caused the price of A to increase to . The price of B, remains the same.

Assume that a typical consumer in Fruitland has cobb douglas utility , and an income of , where and is the consumption of A and B respectively

1. Illustrate graphically in separate diagrams, (i) the compensating variation and (ii) the equivalent variation of the price increase. **(12 marks)**
2. Suppose , and . Calculate the exact value of the compensating variation. **(10 marks)**
3. Will equivalent variation be equal to compensating variation in this case? Explain. *(Hint: you don’t need to calculate EV)* **(5 marks)**

2) Bob, who has wealth of is deciding where to go for tea-time. There are 3 possible options, i) , ii) , iii) , and he can choose only 1 of the options.

If he chooses an option, its value is 1. If he does not choose the option, its value is 0.  
For example, if he chooses , then and so on.

His utility depends on which item he chooses and his leftover holdings of cash as follows: , where .

1. State the definition of quasi-linear utility. Is Bob’s utility quasi-linear? **(4 marks)**
2. Solve for Bob’s reservation prices for option , option and option . **(6 marks)**