EconS 301
Written Assignment #4

Due date: October 6th, 2016.

Exercise #1. Consider a consumer with the following Cobb-Douglas utility function for two goods, 1 and 2,

$$u(x_1, x_2) = x_1^{1/3} x_2^{2/3}$$

Assume that the consumer faces a price of \$1 for good 2, and a total income of \$*I*. The price of good 1 is left unrestricted as p_1.

a) Find the marginal rate of substitution, *MRS*, for this consumer.
b) Set up this consumer's utility maximization problem (UMP), and find the Walrasian demand.
   [*Hint*: Write the tangency condition, solve for x_2, and insert your result into the consumer's budget line. Solving for x_1, you will obtain the demand for good 1. Recall that the expression you find should be a function of the price of good 1, p_1.]
c) Solve for income *I*, in order to obtain the Engel curve of good 1. Is the slope of the Engel curve positive? Interpret: is the good normal or inferior?
d) For the remainder of the exercise, you can assume an income of *I*=\$100. Set up this consumer's expenditure minimization problem (EMP), assuming that he seeks to reach a target utility level of $\bar{u}$. Find the Hicksian demand (also referred to as the "compensated" demand).
   [*Hint*: Write the tangency condition, solve for x_2, and insert your result into the consumer's utility function. Solving for x_1, you will obtain the demand for good 1. Recall that the expression you find should be a function of the price of good 1, p_1.]
e) Assume now that the price of good 1 decreases from $p_1 = \$4$ to $p_1 = \$2$. Find the increase in consumer surplus, CS, that this consumer enjoys from the price decrease.
f) Considering the same price decrease as in part (e), find the compensating variation (CV).
g) Considering the same price decrease as in part (e), find the equivalent variation (EV).

Exercise #2. Repeat your analysis of Exercise #1 for the following Stone-Geary utility function

$$u(x_1, x_2) = 3(x_1 - 1)^{1/2} {x_2}^{1/3}$$

Recall that in this utility function, the consumer requires 1 units of good 1 for his utility from this good to be positive (e.g., a glass of water to remain alive!). This type of utility function has been frequently used to describe addictive goods, such as drugs and alcohol, where the utility that the addicted individual obtains from good 1 (e.g., drugs) becomes negative unless he consumes a dose of the drug per day**.**