Homework #3 (Due on September 14th, 2018)

1. Consider a consumer with the following expenditure function

$$e(p, u^0) = g(p) + \left[u^0 \times f(p)\right]$$

   where functions $g(p)$ and $f(p)$ depend on the price vector p alone. Show that a 1% increase in wealth leads to exactly a 1% increase in consumption (i.e., the income elasticity, $\varepsilon_{x_i,w}$) converges to one when the consumer's wealth level tends to infinity, i.e., $\lim_{w\to\infty} \varepsilon_{x_i,w} = 1$.

2. Consider an individual with a separable utility function over L goods

$$u(x) = \sum_{i=1}^{L} \alpha_i \ln x_i,$$

   where $\sum_{i=1}^{L} \alpha_i = 1$ and $\alpha_i > 0$ for every good i. Assume that the consumer faces a strictly positive price vector $p \gg 0$ and his wealth is given by $w > 0$.

   (a) Find the Walrasian demands, and the shadow price of wealth.

   (b) Let us next find the shadow price of wealth using an alternative approach. First, find the indirect utility function, $v(p, w)$, resulting from the previous UMP. Then, measure how it is affected by a marginal increase in wealth, i.e., find the derivative $\frac{\partial v(p,w)}{\partial w}$. Does your result coincide with what you found in part (a)?

3. Exercise MWG 3.E.6

4. Exercise MWG 3.G.3