Problem Set #2

ECON 6020, Prof. Jason DeBacker
Due Tuesday, February 9, 6 p.m.

NOTE: Feel free to work in groups on these problems. However, I would like each of you to turn in your own solutions.

1. Show that the budget constraint can always be normalized by one of the nominal variables (a nominal variable is one measured in dollars). You may present your “proof” either with equations or a graph.

2. Consider the budget line given by the equation: $2x_1 + $1x_2 = 10. Draw this original budget line. Next, on the same graph, draw the budget line that results when a per unit tax of $1 is applied to sales of good 2. Describe what happens to the budget line.

3. Consider 3 bundles: $(x_1, x_2), (y_1, y_2),$ and $(z_1, z_2)$. Donald Trump has the following preferences: $(x_1, x_2) \succeq (y_1, y_2)$ and $(y_1, y_2) \succeq (z_1, z_2)$. Assume that Donald’s preferences satisfy the three axioms of consumer preferences. What else can you say about his preferences over these three bundles? Draw Donald’s indifference curve through $(x_1, x_2)$. Show where the two other bundles fall relative to this indifference curve.

4. Consider the utility function: $u(x_1, x_2) = x_1x_2$. Pick any monotonic transformation of this function. Show that the monotonic function results in the same preferences (i.e., the same indifference curves).

5. Assume that Donald Trump’s preferences over bad suits and private jet flights are given by: $u(s, j) = s^{3}j^{2}$, where $s$ gives the number of bad suits and $j$ the number of private jet flights. Assume that a bad suit has a price of $1$ (i.e., $p_s = 1$) and that the price of a private jet flight is $2$ (i.e., $p_j = 2$) (maybe these are in tens of thousands of dollars in real life: but the units aren’t important). Further assume that Donald has $30 of income (i.e., m = 30). Solve for Donald’s optimal demand of bad suits and flights.

6. Assume that Hillary Clinton has preferences over pant suits, given by $s$, and private jet flights given by $j$ that can be represented by the following utility function: $u(s, j) = \frac{1}{3}ln(s) + \frac{2}{3}ln(j)$. Further assume that Hillary faces prices $p_s = 1$ and $p_j = 2$ and has income $m = 30$ to spend. Solve for Hillary’s optimal consumption bundle of pant suits and private jet flights.

7. Assume that Bernie Sanders has preferences between organic Vermont cheese ($c=$ one pound of cheese) and maple syrup ($s=$ one cup of syrup) given by: $u(c, s) = 3c + 2s$. Assume that the price per pound of cheese is $p_c = 2$ and that the price per cup of syrup is $p_s = 1$. Further assume that Bernie has $10 to spend. What is his optimal consumption bundle?

8. Are the goods in Hillary’s utility function gross complements or gross substitutes? How do you know?

9. Solve for and draw the Engle curve that represents Hillary’s preferences for pant suits.

10. Solve for and draw the inverse demand function given by Hillary’s preferences for pant suits.