ECON 203
Midterm on Consumer Theory

Be sure to show your work for all answers, even if the work is simple.
This exam will approximately begin at 19:40 and end at 21:20

1. *(6 points)* **Honor Statement:** Please read and sign the following statement:

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2. *(22 points total)* When I was a student my professors would happily criticize *Food Stamps* as a poorly designed program. This program is much like lunch tickets, they would give you a fixed amount of money to buy food with every month–in the US's case it would be for those who have a very low income.

   (a) *(4 points)* In the graph below show the impact of this program on a consumer's budget set. For clarity let F be the amount of food you buy; Y be the amount of other goods you buy; $p_f > 0$ be the price of a unit of food; $p_y > 0$ be the price of a unit of other goods; and I be the fixed income of a representative consumer. Assume that the food stamps program allows you to buy $\underline{F}$ units of food for free.

(b) *(6 points)* How will the subsidy impact consumers? Remember that food is a normal good, and that there will be two different classes of reactions.

(c) *(4 points)* Given this analysis, what do you think the objective of the government program was intended to be?

(d) *(8 points)* The attitude of my professors who criticized the Food Stamps program really angers me. Why do I think it should anger you as well? I.e. which founding assumption of Economics were they (almost) violating?

3. *(20 points total)* Consider maximizing the utility function $U(F,C) = \alpha F^{\frac{t-1}{t}} + \beta C^{\frac{t-1}{t}}$ over the budget set $p_f F + p_c C \leq I$, where $p_f > 0$ is the price of a unit of food, $p_c > 0$ is the price of a unit of clothing, and $I > 0$ is the total income.

   (a) *(2 points)* Set up the Lagrangian you would use to find the optimal quantities of F and C.

   (b) *(4 points)* Find the first order conditions of this objective function.

   (c) *(4 points)* Solve for a function for F in terms of C and prices. It should be linear in C.

(d) *(4 points)* Find the demand for C and simplify.

(e) *(6 points)* Find the demand for F using two different methods and verify that your answer is correct.

4. *(12 points)* Write down and define the three axioms that give us the normative definition of rationality. For each of them explain the type of behavior they rule out (possibly by giving a counter example).

5. *(12 points total)* About Corner solutions.

   (a) *(3 points)* Define the "bang for the buck" of a good.

   (b) *(6 points)* What is a Corner solution? Is it common or rare in the real world? Explain.

(c) *(3 points)* What do we know about the bang for the buck of a good in a corner solution? You may assume this consumer only consumes two goods.

6. *(28 points total)* About the income and substitution effect:

(a) *(8 points)* From the duality identity:

$$h_x\left(p_x, p_y, u\right) = X\left(p_x, p_y, I\left(p_x, p_y, u\right)\right)$$

and the fact that $\frac{\partial I}{\partial p_x} = X$, derive the Slutsky equation in elasticity form.

(b) *(12 points)* Write down the Slutsky equation in elasticity form, defining each term in isolation (if you wrote it down outside of the equation) and which term(s) indicate the income and substitution effect.

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