ECON 201/301, (Fall 2012)

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Midterm # 1

Please solve ALL of the problems below. Let all consumption choices be continuous.

I. Short Problems - Explain! No credit will be given without a justification of your answer (8 pts each)

1. "Quasilinear preferences are strictly convex. Therefore, corner solutions are impossible." Are these statements correct? Explain precisely, using a graph.

2. Students A, B, and C differ along the three dimensions (smart, funny, diligent). Professor Z prefers a student over the other if he is better in (at least) two of those dimensions, while Z is indifferent otherwise. Suppose A is moderately smart, not funny, and very diligent. B is very smart, moderately funny, and not diligent. Finally, C is not smart, very funny, and moderately diligent. Are Z's preferences complete? Are they transitive? Explain!

3. Mila's preferences are described by the utility function $U(x_1, x_2) = 3x_1 + 4x_2$. Use the *substitution method* to find Mila's preferred consumption bundle when prices are $p_1 = 2$ and $p_2 = 3$. Explain your steps and illustrate your result, using a graph with $U(\cdot)$ on the vertical axis.

4. More about the apartment market in College town. 400 students have a reservation price of 400 dollars, 300 students a reservation price of 300, and 200 students a reservation price of 200 dollars. There are 600 apartments available, each owned by a different landlord (with zero reservation price). Using a graph, describe the equilibrium in this market. What will change if the City imposes a rent ceiling of 250 dollars per rental apartment? What if instead, all apartments are owned by one monopolist who can price discriminate? Explain briefly but precisely.

5. The two monkeys Tom and Jessica have preferences over apples (good 1) and bananas (good 2). There is no money. Tom's preferences can be

described by the utility function $U(x_1, x_2) = 4x_1 + 4x_2$, and Jessica's by the function $U(x_1, x_2) = \min\{x_1, x_2\}$. Suppose Jessica's consumption bundle is $(5, 3)$ and Tom's consumption bundle is $(4, 4)$. Is this outcome Pareto efficient? Short but precise explanation, please.

Long Problem (32 pts.) (Explain your answers!)

Once a week Kathryn shops for groceries at the *BUY LOW* Supermarket. She always buys Happy Janet fruit smoothies (good 1) and Cutella spread (good 2), and her preferences over these items can be described as $U(x_1, x_2) = x_1^2 x_2$. Prices are $p_1 = 4$ and $p_2 = 3$, and Kathryn's income is $m = 80$.

a) Find Mandy's *demand function* $x_1(p_1, p_2, m)$ for good 1. Which bundle will she buy at the given prices? Without further computations, argue how her demand for Happy Janet changes when the price of Cutella becomes $p_2 = 5$.

b) The government needs money and imposes a quantity tax of $t = 2$ dollars on smoothies. Find out the tax revenue R associated with Kathryn's consumption. Instead, assume Kathryn has to pay the same amount R as a fixed 'head tax' tax to the government. Graph results for both taxes in a diagram (provide slopes etc.), and explain briefly.

c) [disregard b)] *Buy Low* runs a promotion where shoppers can buy the first 8 bottles of Happy Planet at a discounted price of $p_1 = 2$. (i) Graph Kathryn's new budget line (label everything properly), and provide the slopes. Explain briefly. (ii) Find the formula(s) for the budget line. Explain briefly what you are doing. (iii) Find and graph Kathryn's optimal consumption bundle (Note: she will buy more than 8 units of good 1).