73230 Intermediate Microeconomics
Midterm 1

February 27, 2019

YOUR NAME (please print):
ANDREW ID (please print):
Recitation Section:

You have 1 hour and 20 minutes. Points for each question are indicated below. Please explain your answers and show your work for full credit.

Problem 1 (50 pts)

Consider a consumer whose utility funciton is given by $u(x_1, x_2) = \min(x_1, 2x_2)$. The price of good 1 is $p_1 = \$2$, the price of good 2 is $p_2 = \$4$. The consumer has \$240 to spend.

(a) (5 pts) Write down the consumer's constrained optimization problem.

(b) (15 pts) What is the consumer's optimal consumption bundle? Illustrate your answer on a graph.

(c) (20 pts) Assume that the price of good 1 has increased to $p_1' = \$4$. Find the new optimal consumption bundle and decompose the total effect from the price change into the income effect and the substitution effect. Illustrate your answer on a graph.

(d) (10 pts) The producer of good 1 introduces a new pricing scheme: the price of the first 30 units is $p_1 = \$3$/unit, after that the price is \$1/unit. Illustrate the new budget line on a graph. Compared to (b), is the consumer better off or worse off?

Problem 2 (40 pts)

Sadio chooses the number of hours for work, and he has in total 2400 hours per year to either work or spend time with his family. His utility over consumption (C) and hours spent with his family (L) is $u(C, L) = CL$. The price of consumption is \$1/unit, and the hourly wage is $\$w$. He owns a house, and he pays property taxes, \$M. Note that the amount of consumption is the after tax income.

(a) (20 pts) Derive Sadio's labor supply function.

(b) (10 pts) Sadio's city is considering to increase the property tax to strengthen the public school system. Assume the wage rate is not affected by the proposed tax policy. Will he increase his labor supply if the government implements the policy?

(c) (10 pts) How would your answer to (a) and (b) change if Sadio's utility function is given by $u(C, L) = \sqrt{C}\sqrt{L}$?

Problem 3 (10 pts)

Jasmine's preferences over cars are described as follow: One car is preferred to another if its fuel efficiency is higher by at least 2 MPG (mile per gallon). Otherwise Jasmine is indifferent between the two. Are Jasmine's preferences complete? Are they transitive?