

MIDTERM EXAM

ECON 210
PROFESSOR GUSE

Instructions. You have 2 hours to complete the exam. There are a total of 75 points available. It is designed to take about 1 minute per point. You are allowed to reference a single page of notes, 2-sided. You may *not* use any other notes, books or aids of any kind, be they human, electronic or mechanical. Calculations may be left in expression form for full credit. There is space provided for each question. If you need additional space, you may write on the back of the pages or use additional sheets and staple them to your exam when you turn it in. Please show all of your work. (Or at least enough so that the grader can figure out how you arrived at your answers.) Please write your name on the exam itself and record the time you started and time you finished. Finally please turn in your cheat sheet with your exam.

Name:

Date and Time Started:

Date and Time Finished:

Pledge:

Date: Tuesday February 9, 2006.

- (1) (10 points) Frederica gets a weekly allowance of m and cares only about her current weekly consumption of bananas and licorice. The price of bananas is \$1 each. Last week, the price of licorice was \$1 per ounce and Frederica consumed 8 bananas and 8 ounces of licorice.
- (a) What is m equal to?
- (b) This week the price of licorice increased to \$1.50 per ounce and Frederica's consumption of licorice decreased to 6 ounces. Are bananas a normal or inferior good? Explain using a diagram.

- (2) (20 points) Sven consumes only bacon and eggs. Furthermore, he eats exactly 2 eggs for every strip of bacon and will not eat them in any other ratio.
- (a) (5 pts) write down a utility function which represents Sven's preferences over bundles of strips of bacon (B) and eggs (G).
- (b) (5 pts) Draw a picture of Sven's optimal choice if his income is \$25, the price of bacon is \$1 per strip and eggs are \$0.50 each.
- (c) (5 pts) What is Sven's demand for eggs as a function of income and prices?
- (d) (5 pts) Ole also likes eggs and bacon in the exact same strict ratio as Sven. However, Ole also likes orange juice (J) and always spends exactly 20% of his income on orange juice and 80% on bacon and eggs. Write down a utility function to represent Ole's preferences over B, G and J. [Hint. It may be easier to start by writing down demand functions for the three goods.]

- (3) (25 points) Maurice has nice rational preferences for slices of pizza (x_z) and pints of beer (x_b) represented by a utility function, $u(x_z, x_b)$. His utility function exhibits the following properties

$$\frac{\partial u(x_z, x_b)/\partial x_b}{\partial u(x_z, x_b)/\partial x_z} = \frac{1}{3} \text{ whenever } x_z = 0 \text{ and } x_b > 0$$
$$\frac{\partial u(x_z, x_b)/\partial x_b}{\partial u(x_z, x_b)/\partial x_z} = 2 \text{ whenever } x_b = 0 \text{ and } x_z > 0$$

- (a) (5 points) In 25 words or less, explain in plain English how Maurice feels about beer when he hasn't got any beer.

- (b) (10 points) Suppose that income, m is greater than zero and that the price of pizza, p_z , is \$1 per slice.
- (i) Give an example of an income level and a price of beer that would lead Maurice to optimally choose an *interior* bundle - one with strictly positive amounts of beer and pizza.

 - (ii) In a diagram, show Maurice's budget line for the parameters you chose.

 - (iii) Show the optimal choice and sketch the indifference curve going through it.

 - (iv) Pick another point on the budget line you drew and explain why it is or is not an optimal choice for Maurice.

- (c) (10 points) Keep the assumptions that $p_z = 1$ and $m > 0$.
- (i) What is the lowest price of beer which leads Maurice to optimally choose an interior bundle?

 - (ii) What is the highest price of beer which leads Maurice to optimally choose an interior bundle?

 - (iii) Draw a picture showing the beer-price expansion path.

(4) (20 points) Household A has nice rational preferences for rice, x_r , and fish, x_f . The household's weekly demand for rice and fish are given by the functions $x_r(p_r, p_f, m)$ and $x_f(p_r, p_f, m)$ respectively, where p_r is the price of rice, p_f is the price of fish and m stands for the A's weekly income.

(a) (10 points) Suppose that the price of fish is fixed at \bar{p}_f and A's income is \bar{m} . When the price of rice decreases from p_r^H to p_r^L , the demand for rice falls from $x_r(p_r^H, \bar{p}_f, \bar{m})$ to $x_r(p_r^L, \bar{p}_f, \bar{m})$. In other words assume that $p_r^L < p_r^H$ and $x_r(p_r^L, \bar{p}_f, \bar{m}) < x_r(p_r^H, \bar{p}_f, \bar{m})$. Consider what happened to A's demand for *fish* when the price of rice decreases from p_r^H to p_r^L as just described. Which of the following is true.

- $x_f(p_r^L, \bar{p}_f, \bar{m}) < x_f(p_r^H, \bar{p}_f, \bar{m})$
- $x_f(p_r^L, \bar{p}_f, \bar{m}) > x_f(p_r^H, \bar{p}_f, \bar{m})$
- $x_f(p_r^L, \bar{p}_f, \bar{m}) = x_f(p_r^H, \bar{p}_f, \bar{m})$

Explain your answer using a diagram if necessary. What can you say about the income and substitution effects on the demand for fish?

- (b) (10 points) Suppose that in addition to the decrease in the price of rice, income changed to m' defined as follows.

$$m' = p_r^L x_r(p_r^H, \bar{p}_f, \bar{m}) + \bar{p}_f x_f(p_r^H, \bar{p}_f, \bar{m})$$

Does A prefer the budget with parameters $(p_r, p_f, m) = (p_r^H, \bar{p}_f, \bar{m})$, or would they rather face the budget given by parameters $(p_r, p_f, m) = (p_r^L, \bar{p}_f, m')$. Explain your answer using a diagram, if need be.