

## 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:

Time Finished:

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*Date:* Feb 15, 2007.

- (1) SHORT ANSWER (20 Points)
- (a) (4 points) Consider the binary relation defined on the set of Winter 07 Intermediate Micro students, “sits to the left of”, as in “Student A [sits] / [does not sit] to the left of Student B.” Is this a *rational* binary relation? Explain why or why not.
- (b) (3 points) Harold has some potatoes and some fried chicken. He can exchange potatoes for fried chicken at the rate of 3 pounds per bird. He is willing to give up potatoes for fried chicken at the rate 2 pounds per bird. Recommend a feasible trade for Harold to improve his welfare? If there isn't one, state why.
- (c) (3 points) Write down a condition involving a discount rate  $r$  which, if true, suggests that building a dam which costs \$50 million to build and will provide \$2 million per year in benefits forever is worthwhile.
- (d) (4 Points) In an apparent contradiction to the law of demand, under what conditions could an individual's demand for a normal good increase after an increase in the price of that good?

- (e) (6 points) Carrie borrowed \$20,000 for a new car at an annual rate of 8% interest. She will make annual payments of \$3000 starting in exactly one year. How long will it take Carrie to pay off her loan? (Don't calculate; just write an expression.)

- (2) (15 Points) Sally has smooth convex rational preferences for consumption and leisure. Assume that both leisure and consumption are normal goods. Sally has a very flexible employer who lets her work as many hours per week as she likes up to 60 and pays her \$5 per hour. Under the status quo (SQ), Sally is guaranteed government assistance of \$100 per week.
- (a) (5 points) Draw Sally's budget under the status quo.
  - (b) (1 points) Under the status quo, Sally chooses to work 20 hours per week. Mark this choice in your diagram and label it "SQ".
  - (c) (5 points) Tad Chiggrin complains that the government should not have to pay for welfare benefits for people like Sally who earn their own income. He proposes welfare reform plan "C" where a welfare recipient's assistance is reduced by \$1 for each dollar that person earns and predicts that his proposal will remove people like Sally from the welfare rolls saving the government millions of dollars. Draw Sally's budget under plan "C" in the same diagram.
  - (d) (4 points) A prominent liberal lawmaker Saul Goodrock says the Mr. Chiggrin's proposal will result in poverty for people like Sally and moreover plan 'C' is unlikely to save the government any money. Is Goodrock's critique valid? Explain.

- (3) (20 Points) Fanny has preferences for this year's consumption ( $c_1$ ) and next year's ( $c_2$ ) represented by the following utility function.

$$u(c_1, c_2) = \log c_1 + \log c_2$$

Fanny expects to earn \$500 in both periods. Fanny can save and borrow at an interest rate of 25%.

- (a) (4 points) Draw Fanny's budget set. Be sure to label the intercepts and indicate the MRT.
- (b) (4 points) Sketch the indifference curve that runs through her endowment. What is Fanny's MRS at her endowment point? Be sure to interpret your answer.
- (c) (2 points) Will Fanny save or borrow? Explain.

(d) (6 points) Write down an expression in terms of the interest rate  $r$  which represents how much Fanny will save or borrow? (Hint. You may want to write down Fanny's demand for  $c_1$  first.)

(e) (4 points) Would Fanny ever switch her saving/borrowing decision? How much and in what direction would the interest rate have to change? (Hint. You can answer this question even if you were unable to answer the previous one.)

- (4) (20 Points) Fred cares about the consumption of his two children Al and Betty according to the following utility function.

$$u(c_A, c_B) = \min \{c_A, c_B\}$$

Fred has allocated \$200 per week in allowance money for his children. Let  $t_A$  be the transfer Fred gives to Al and  $t_B$  the transfer Fred gives to Betty. In addition, Al and Betty both have jobs. Let  $m_A$  be what Al earns in his job and  $m_B$  what Betty earns, so that  $c_A = m_A + t_A$  and  $c_B = m_B + t_B$

- (a) (6 points) Suppose Al and Betty earn the same income. In particular, assume that  $m_A = m_B = 50$ . Draw Fred's budget and label his optimal choice. Describe his choice in terms of the allowance he gives to each of his children.

- (b) (6 points) Suppose Al earns more than Betty. In particular, assume that  $m_A = \$100$  and  $m_B = 50$ . Redraw Fred's Budget (in a new diagram, if you like) and label his optimal choice. How does Fred allocate his childrens' allowances now?
- (c) (8 Points) Fix Betty's income at \$50 per week and assume that Al earns \$10 per hour. Consider Al's labor supply decision. Draw his budget for leisure and consumption. Assume that Al could work up to 40 hours per week. How does his wage compare to the marginal rate of transformation he faces?