Assignment 2

ECON3122, Intermediate Microeconomics

Due: Thursday, February 7th, by end of class

Directions: Answer all questions completely. Note the due date of the assignment. Late assignments will be accepted at the cost of 15 points per day, up until 3pm on Tuesday, February 12th. At that time I will return the graded assignments and post the answers on the web. You may turn in assignments to me after that time so that I can check your work for you, but please realize that you will not receive a grade for the assignment. You may work in a group consisting of up to 3 members – for each group please turn in only 1 set of answers and make sure all group member names are on that set of answers. All group members will receive the same grade.

1 Consumer Choice (55 points)

Suppose that a consumer has the following utility function:

$$U\left(Q_A, Q_B\right) = Q_A + Q_B$$

This is a utility function for perfect substitutes. Assume that $Y = \$50$ and that $P_A = \$2$ and $P_B = \$5$.

1. (5 points) Calculate the utility of the following bundles:

    $(Q_A = 6,\ Q_B = 12)$

    $(Q_A = 18,\ Q_B = 0)$

    $(Q_A = 8,\ Q_B = 8)$

    $(Q_A = 0,\ Q_B = 18)$

2. (5 points) Write down the consumer's budget constraint, using the amounts given in the set-up of this question to fill in for any exogenous variables in the budget constraint.

3. (5 points) How many units of good A would the consumer purchase if he purchased 0 units of good B? How many units of good B would the consumer purchase if he purchased 0 units of good A?

4. (10 points) What is the Marginal Rate of Transformation (MRT) of goods A and B? What is the Marginal Rate of Substitution (MRS) of goods A and B? (Hint: The goods are perfect substitutes.)

5. (10 points) Draw a graph (not necessarily to scale, but representative of the problem) that includes at least 2 indifference curves and the budget constraint. Be sure to label the axes of your graph.

6. (10 points) Find the consumer's optimal bundle. What is his utility at this bundle? (Hint: Use your graph in part 4 as an aid.)

7. (10 points) At the optimal bundle, is the condition that $\frac{MU_A}{P_A} = \frac{MU_B}{P_B}$ satisfied? Explain why or why not. (Again, if the graph is drawn correctly it may help.)

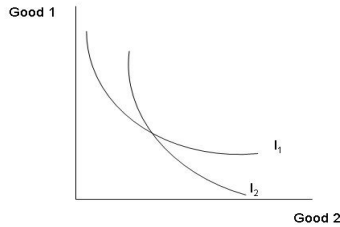## 2   Indifference Curves (36 points)

Look at the following indifference curves. Explain why the indifference curves in each graph violates (at least) one of the properties of consumer preferences. Note that the 2nd indifference curve is 2 bundles thick. (4 points each)
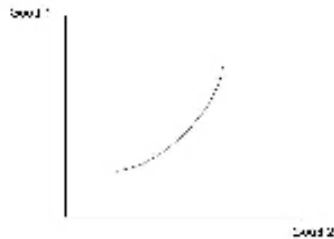
1.

2.

3.

On a separate sheet of paper, draw at least 3 indifference curves for each set of preferences listed below. Label the lowest indifference curve I_1, the middle indifference curve I_2, and the highest indifference curve I_3. (8 points each)

1. Put left shoes on the y-axis and right shoes on the x-axis. Russ must have a left shoe to go with each right shoe.

2. Put sardines on the y-axis and pizzas on the x-axis. Tim gets zero utility from consuming pizzas but enjoys sardines immensely.

3. Put Georgia-Pacific copier paper on the y-axis and Xerox copier paper on the x-axis. Karen is indifferent between which type of paper she uses.

3 One good shoe (9 points)

If you have ever gotten a flat tire on your car and the tire is beyond repair you know that you can get a single tire replaced on your car and that a market exists for this good (the one tire you need) and this service (changing the tire). But what about shoes? Say that something happens to one of your shoes – your dog, instead of eating your homework, decides to eat just your right shoe of your brand new pair of shoes. Is there a similar market for one good shoe? In other words, can you find just a right shoe for sale somewhere or do you need to purchase a new pair of shoes? If you know of such a market provide some evidence. If you believe that no market for "one good shoe" exists, explain why a market for "one good shoe" does not exist while a market for "one good tire" does exist.

4 Bonus (5 points)

Suppose we have a demand function that is:

$$\ln\left(Q_D\right) = a - b\ln\left(P_{own}\right).$$

Show that the coefficient on $\ln\left(P_{own}\right)$ is the own-price elasticity of demand. Note: You will probably need to use some calculus to do this.