

Problem Set 3

Due Lecture 4 in class on paper

1. GLS Chapter 6, Question 8

(a) Find marginal utilities

from X_1 to X_2	Abe's MU	Barbara's MU	Chuck's MU
2 \rightarrow 3	4	0	2
3 \rightarrow 4	2	0	3
4 \rightarrow 5	1	-1	4
5 \rightarrow 6	0.5	-8	5

(b) Are any of our standard assumptions violated?

Barbara's utility decreases as she consumes more of X . This violates our "more is better (or at least not worse)" assumption.

Chuck's marginal utility is sometimes increasing in his consumption. This violates assumption 4.

(c) Could these three consumers have the same preferences, and the difference between the columns is just due to arbitrary scaling?

First consider Barbara: her utility is declining in X , while Abe's and Chuck's utility is increasing. Thus, Barbara cannot have the same preferences as Abe and Chuck.

Could Abe and Chuck have the same preferences? Yes, if we re-scale. Recall that utility is in arbitrary units, so that, as long as Abe and Chuck rank order the same bundles in the same way, we cannot distinguish their preferences.

2. GLS Chapter 14, Question 13

(a) Are you maximizing your utility?

We know that when utility is maximized, it must be the case that

$$MRS_{X,Y} = -\frac{P_X}{P_Y}, \text{ or}$$
$$\frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$$

If $MRS_{X,Y} = 4$ and $P_X/P_Y = 4/2 = 2$, the above condition does not hold. Therefore, you cannot be maximizing your utility.

(b) If not, are you buying too much X or too much Y ?

The fundamental problem is that $MRS_{X,Y} > -\frac{P_X}{P_Y}$. You can't change the prices in the marketplace, so you should change your consumption of X and Y . The goal is to make $MRS_{X,Y}$ smaller.

How can you do that? At present, your marginal utility from consuming X is a lot more than your marginal utility of consuming Y . If you consume more Y and less X , your marginal utility of X will increase (recall that we usually assume declining marginal utility¹) relative to your marginal utility of Y . This will only make $MRS_{X,Y}$ larger.

Suppose you consume more X and less Y . If you increase your consumption of X , your marginal utility of X will decline, and your marginal utility of Y will increase. This will cause $MRS_{X,Y}$ to decrease.

3. GLS Chapter 20, Question 19

(a) What is the minimum Jerry will have to spend?

The minimum amount Jerry has to spend is given by the budget constraint that is tangent to the indifference curve that shows all points that make Elaine equally happy at $U = 200$.

Luckily, this budget constraint is given in the picture. We know the two endpoints of the constraint, from which we can figure out the total amount Jerry would need to spend. Recall that any point along the budget constraint spends the same amount of money – just in different quantities of daisies and daffodils.

Therefore, 62 daisies at \$3/daisy, implies a budget of \$186. Similarly (it should yield the same amount!), 31 daffodils at \$6/daffodil implies a budget of \$186. The point that is tangent to the indifference curve, of which we do not know the exact coordinates, must also imply a budget of \$186.

(b) How much happiness will Elaine get from spending this money?

The maximum happiness Elaine could get from spending this money is $U = 200$.

¹This implies that, for example, your fourth unit of consumption of X gives you more utility than your fifth unit of consumption of X .