Chapter 2 – A Theory of Preferences

1. This question can lead to a great class discussion. Does maximization mean purely selfish or does it only mean self-interested. In other words, do people help others only because there is something in it for them, or is altruism possible? In either case, the economist would say her behavior is not refuting the maximization assumption.

2. In equilibrium the rate of return to each stock must be the same. Hence the one that does not pay dividends must have a higher expected capital gain.

3. Gordon Tullock claims that this is the acid test question that tells if someone thinks like an economist or not. The answer is no.

4a. Dizzy's indifference curves are vertical lines.

b. The following are utility functions for Dizzy: x_1, $10x_1$, $(x_1)^2$. Indeed, any monotonically increasing function of x_1 will represent Dizzy's preferences.

5a. Assuming you don't mind the bulk of all the nickels, the indifference curves are straight lines with a slope of -5 (assuming nickels are on the vertical axis).

b. If the consumer has two hands, the indifference curves will have right-angled kinks along the line $x_1 = x_2$. Above the kink, they will be vertical, and to the right of the kink, they will be horizontal. If the consumer has only one hand, the indifference curves will be vertical or horizontal, depending on which hand the consumer has.

c. Let x_1 represent quantity of cocaine and x_2 represent money. The indifference curve will be downward sloping and concave to the origin. In moving from left to right along the indifference curve, *MRS* will increase.

d. Letting x_1 represent quantity of lobster and x_2 represent money, the indifference curve will be U-shaped. In the upward-sloping portion, if the individual is forced to eat more lobster, more money is required to get him or her back to the indifference curve.

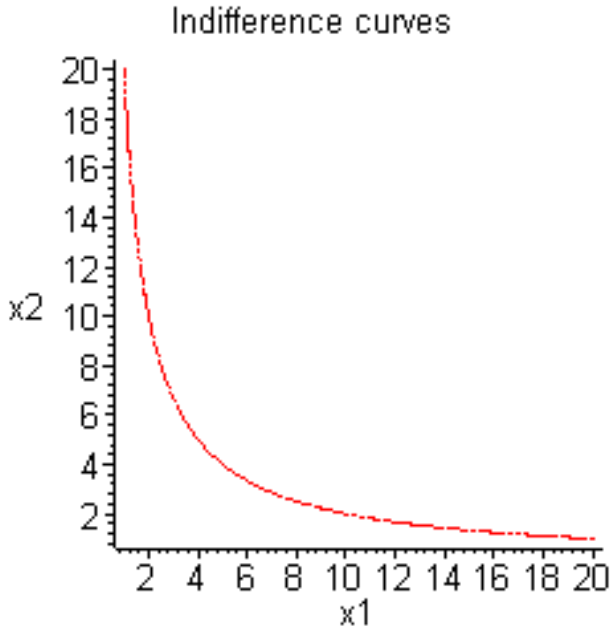
With free disposal, the upward-sloping portion of the indifference curve is replaced by a horizontal line.

e. The indifference curve will be a straight line with a slope equal to - 1.

f. The indifference curve will be upward sloping.

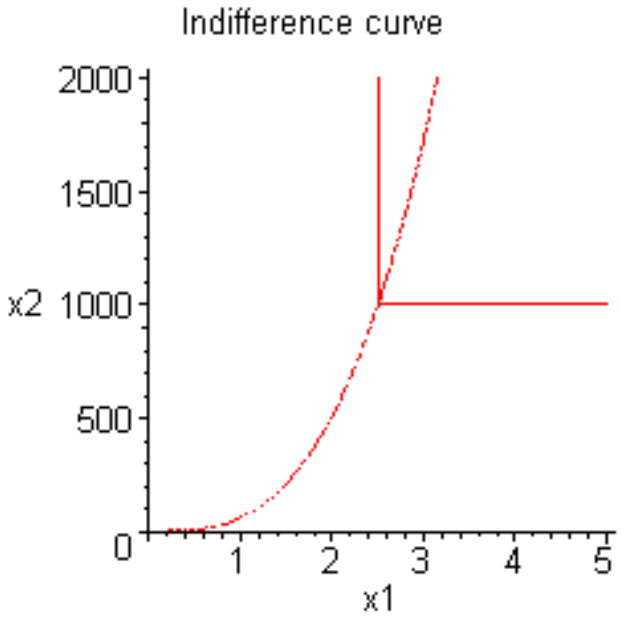
g. The indifference curves will again be downward sloping and concave to the origin, as in (c), but the preference ordering will be increasing towards the origin.

6a. All three indifference curves are coincident.



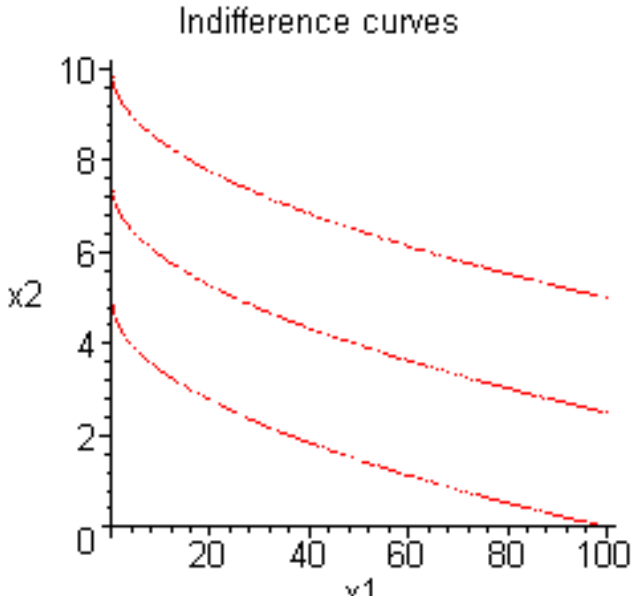
b. The second utility function can be derived from the first by dividing by8, and the third can be derived from the first by dividing by 2 then squaring. Hence, all three functions represent the same preference ordering because they maintain the MRS. They are just monotonic transformations of each other.

7a. Her indifference curves have right-angled kinks along the line $4x_1 = x_2^{1/3}$, and they are vertical above the kink and horizontal to the right of it.



b. Her preferences do not satisfy the diminishing marginal rate of substitution assumption — the marginal rate of substitution is not even defined at the kink in the indifference curve, it is infinite along the vertical segment of the indifference curve, and it is zero along the horizontal segment.

8a. First plot the indifference curve for utility number 10. It passes through the following consumption bundles: (0,5), (1,4.5), (4,4), (16,3), (25,2.5), and (100,0). To get the indifference curve for utility number 15(20), move the first one vertically up by 2.5 (5) units.



b. Along any vertical line, all three indifference curves have the same slope. In other words, *MRS* is determined exclusively by quantity of good 1. To put it another way, for these preferences, *MRS* is independent of quantity of good 2.

9a. The logic is wrong. Many goods are free to the user, but they are still scarce and someone pays for them. Whether or not water and air are scarce depends on the quantity supplied and demanded at a zero price.

b. Even the richest man on earth faces scarcity of something. For many wealthy people the binding constraint is time.

c. Smallpox is rare, it is not scarce. Scarcity implies that someone wants the good.

10. One of the implications of maximization is that individuals cannot systematically learn from others how to make above normal returns. Teachers of this type of knowledge would just make the money themselves. Hence, individuals who at a young age think they have what it takes to be great stock brokers, just enter the industry. Marginal brokers are more likely to go to school. It is not that universities make reduce the human capital of brokers, but that we observe a sample that is filtered by individual maximization.

11a. This indifference curve is composed of two segments: the line $x_2 = 10$, for $x_1 \leq 10$; the line $x_1 = 10$, for $x_2 \leq 10$. The two segments intersect at (10,10).

b. $U(x_1,x_2) = \max(x_1,x_2)$ where "max" means "the maximum of." Jack's indifference curves are nonconvex, they do not satisfy the non-satiation assumption, and they are kinked.

12. They make it clear that the first person to attack is killed. Hence no one moves first, and the plane is held.

13. The general must make certain that the probability of death is low enough for the soldier to be willing to fight. If the soldiers were in a single column, the first would be killed for sure, and like the people on the airplane, no one would be first.

14. When you fire your weapon you draw attention to yourself. The best way to get killed in battle is to draw attention to yourself.

15. Assuming that boys and girls are not viewed as perfect substitutes (“we don’t care what the sex is, as long as the child is healthy”) then those families with only girls or only boys, should be more likely to have a third child because the marginal value of the child is higher.

16. Contractors are profit maximizers, which means they must minimize costs. As a result they build male and female washrooms adjacent to one another in order to use the same set of plumbing.

17. If the constraint is binding then Carl will certainly have all three drinks before 10. However, he will also substitute into harder liquor in order to maximize the amount of alcohol over the three drinks.

18. This is both maximization and substitution. Building straight buildings is costly and if one can get away with doing a poor job, one does.

19. You may have fewer armed robberies, but of the ones committed they would be much more violent. Essentially this would eliminate any marginal deterrence to the law.

20. Frequent flyer programs are mostly designed for business travelers who do not pay for their flights. Lower prices would benefit the firms, but the choice over which flight to take is often made by the traveler. Hence the points are a way of rewarding the decision maker.

21a. $MU_1 = 3/5x_1^{-2/5}x_2^{2/5}$ $MU_2 = 2/5x_1^{3/5}x_2^{-3/5}$

b. $MRS = MU_1/MU_2 = 3x_2/2x_1$

c. MRS goes to zero. MRS tends to infinity. In general, as the relative quantity of good 1 goes up (x1/x2 increases), the MRS goes down. That means that the individual wants more and more units of good 1 to give up one unit of good 2, if she has good 1 already in large quantities

d. Yes.

22a. All of the MRS are equal to x_2/x_1. The MRS is independent of a monotonic transformation of the utility function.

b. (i) $MU_1=2x_2$, (ii) $MU_1=x_2/4$, (iii) $MU_1=2x_1x_2^2$ Unlike the MRS, the MU's are not independent of transformations of the utility function. This result occurs because MRS only depends on the quantity of the goods, not the level of utility.

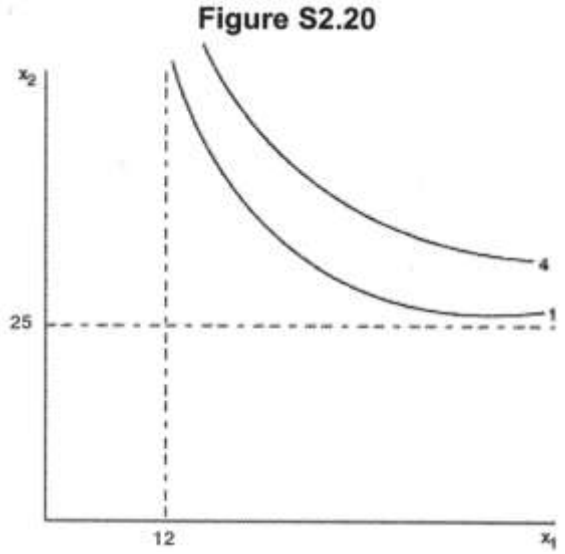
23. $MRS=.25x_1^{-1/2}$ which does not depend on x_2. If you knew one indifference curve you would know them all since this means that the indifference curves are vertically parallel.

24a. Sure.

b. $MRS=(x_2-12)/(x_1-25)$.

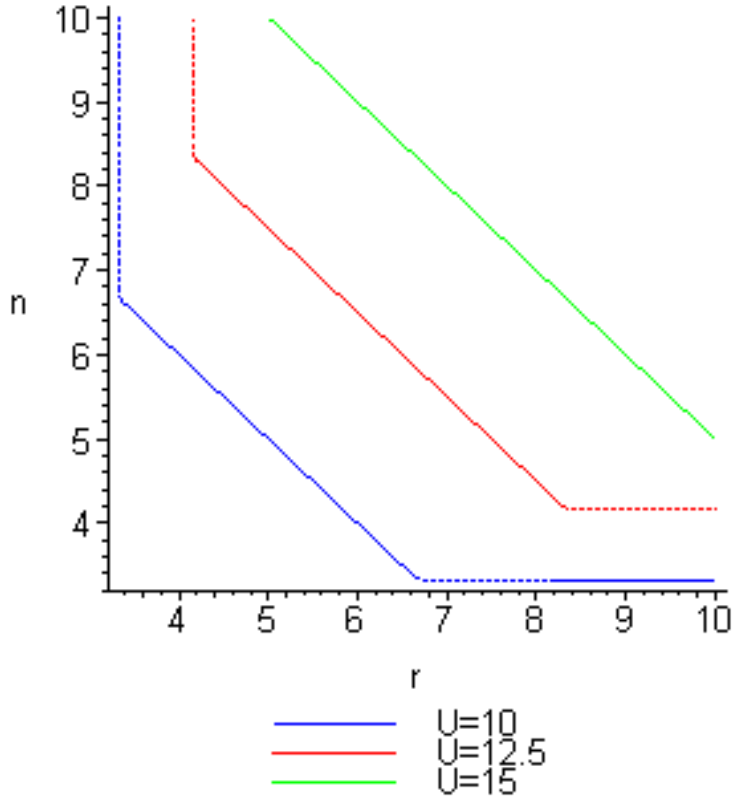
c. Nothing, it is not defined.

d. See Figure S2.20



25a. (i) Indifferent (ii) (5,6) (iii) (3,4)

b. Slope of –1 but horizontal when r > 2n and vertical when n > 2r.



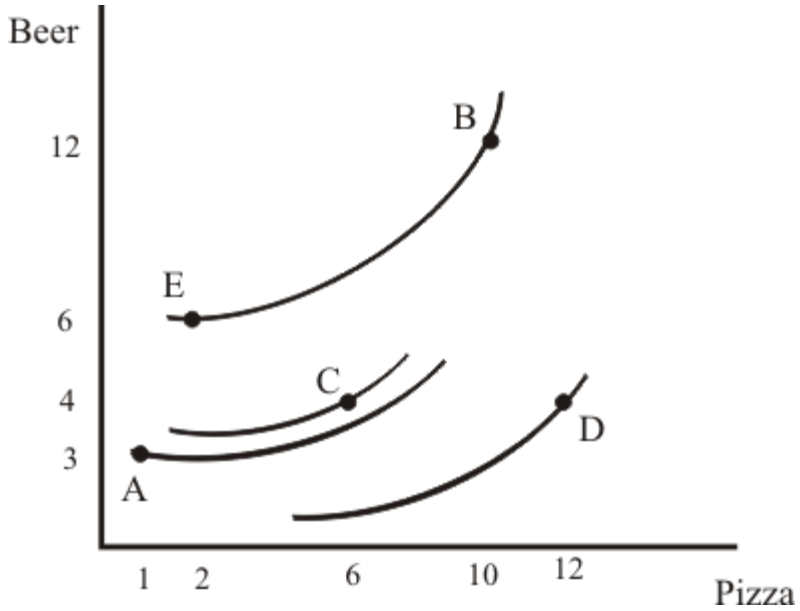
26a. Yes.

b. No. This is not a marginal change anymore — diminishing marginal rate of substitution implies that the offer is too low.

27.
(a) Yes.
(b) No.
(c) Yes, by the money pump strategy. Joe will pay a small amount (or zero if indifferent) to trade your Mars Bar for his Mr. Big bar. He'll then pay a small amount (or zero if indifferent) to trade your Mr. Big bar for his M&M's. He'll then pay a small amount (or zero if indifferent) to trade your M&M's for his Mars Bar. At least one of the trades will earn you a positive amount of money, and you end up with your Mars Bar. Continue this cycle of trades until you get his entire dollar.

28. Banks like to receive high interest payments, but they also like high probabilities that they will be repaid at the end of the term. Longer terms give borrowers more opportunities to get into financial trouble, and therefore the probability that they will repay the loan falls with the length of the term. Therefore, banks tradeoff lower interest rates for shorter terms.

29a.



b. Clearly Pizza is a bad for John. Given the shape of the indifference curves E=B>C>A>D. However, Bundles C and A could reverse if the indifference curves were steeper in that region.

30a. Yes. For example, Anne could trade all of her Chocolates for Beth's flowers.

b. Yes, same as part (a).

31. (i) $U(x_1, x_2) = x_1 + x_2$
(ii) $U(x_1, x_2) = x_1x_2$
(iii) $U(x_1, x_2) = \min(x_1 + x_2)$
(iv) $U(x_1, x_2) = \max(x_1 + x_2)$