

# Homework 2 - ANSWERS

## Budgets and Preferences

Econ 101  
Professor Guse

Fall, 2006

1. Consider a two-good world with pizza and beer. Betty has a weekly income of \$60. The price of pizza,  $p_z$ , is \$10 per pie. The price of beer,  $p_b$ , is \$5 per pint.

(a) Draw the budget set. **ANSWER:**

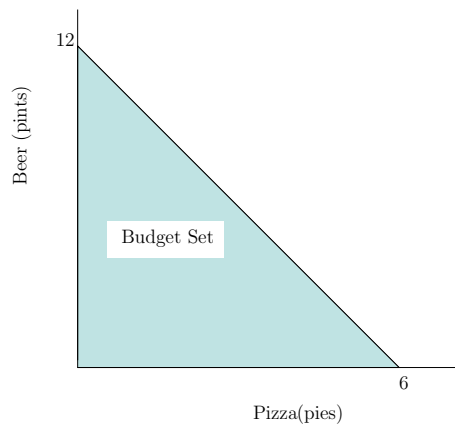


Figure 1. The Budget Set consists of all the consumption bundles on the budget line and beneath it.

- (b) Suppose that the pizza parlor offers Betty a deal in which they will give her a free pizza whenever she buys two at full price. Redraw her budget set. **ANSWER:**

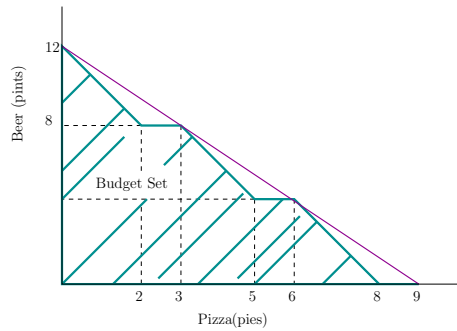


Figure 2. The Blue Budget Line and shaded area is the budget set under the offer described. Note that the straight budget line above (in magenta) would have been the budget line if the price of pizza been simply lowered to \$6.66. The picture shows the difference between reducing the price by a third and giving away every third unit. Question: Will consumers buy more pizza under the magenta budget line (price is \$6.666 per pie) or under the blue one (price is \$10 per pie with every third one free)?

2. Cookie monster has  $m$  to spend each month on milk and cookies. The price of milk is  $p_m$ . The price of cookies is  $p_c$ .

(a) Draw Cookie Monster's budget set. **ANSWER:**

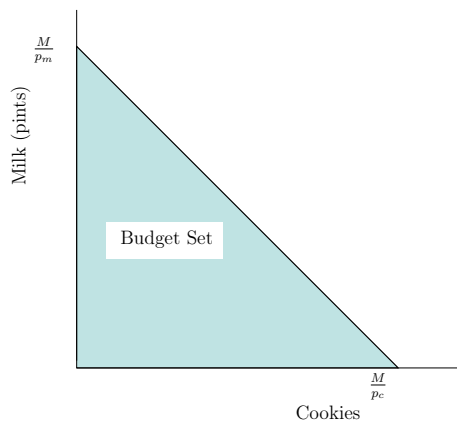


Figure 3. 'C' is for Cookie and that's good enough for me!

- (b) The government want to help Cookie Monster eat better and issues him  $K$  dollars worth of "milk stamps". Redraw Cookie Monster's budget set. Assume that milk stamps cannot be spent on cookies nor can they be redeemed or sold for cash. **ANSWER:**

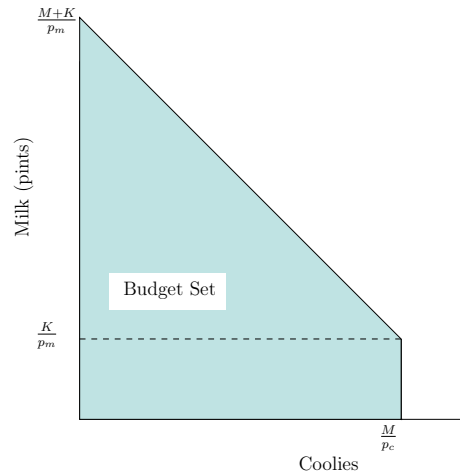


Figure 4. Unless cookie monster was drinking no milk before getting the stamps, the milk stamps will probably cause him to eat more cookies - if cookies are normal. Can you explain why?

- (c) Assume that Cookie Monster is able to sell his milk stamps on Sesame Street's underground market for fifty cents on the dollar. Redraw his budget set. **ANSWER:**

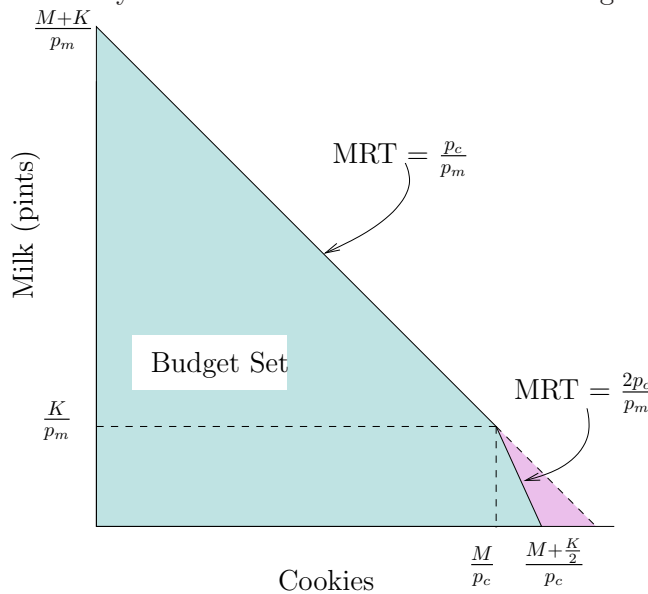


Figure 5. Cookie Monster's Budget Set is the blue shaded area and the budget line bounding it. Along most of Cookie Monster budget line the MRT is  $\frac{p_c}{p_m}$ , but when he starts to consume so many cookies - more than  $\frac{M}{p_c}$  - that he has to sell his milk stamps for 50 cents on the dollar his MRT doubles to  $\frac{2p_c}{p_m}$ . In words, Cookie Monster has to give up twice as much milk to get cookies along that lower part of his budget line. The diagonal dashed line and shaded purple areas represent the consumption bundles Cookie Monster could have had if the Sesame Street underground were paying face value for milk stamps (or if the government had just given Cookie monster  $K$  in cash instead of milk vouchers.)

3. Consider the preferences for bundles of Good 1 and Good 2 depicted below. Assume that preference are monotonic (more is better).

(a) Rank the bundles from most preferred to least preferred noting any ties. **ANSWER:**

$$c \succ e \succ b \succ d \sim f \succ a$$

(b) Shade in area representing all bundles which this consumer likes at least as much as bundle  $f$ . **ANSWER:**

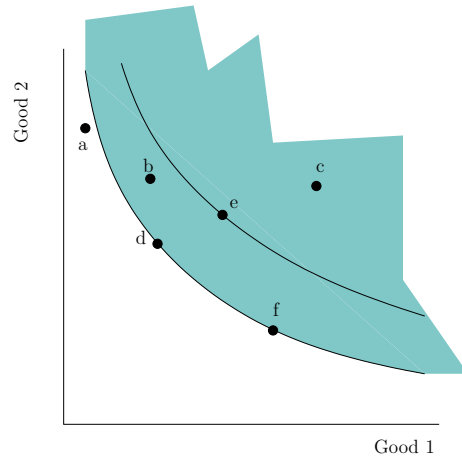


Figure 6. The *upper contour set* of  $f$  consists of all the consumption bundles which are on the same indifference curve as  $f$  and all those consumption bundles which are on higher indifference curves as well. This is the shaded area above.

4. Consider the bundles of Good 1 and Good 2 depicted below. The two diagrams show the exact same bundles. Assume that both Jaime on the left and Lucy on the right are rational and have convex monotonic preferences.

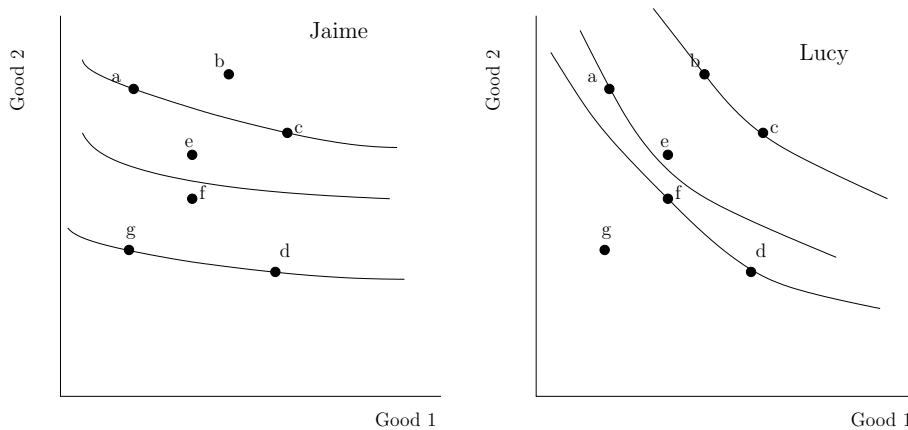


Figure 7.

(a) Draw Jaime's indifference curves so that they reflect the following preference ordering.

$$b \succ a \sim c \succ e \succ f \succ g \sim d \tag{1}$$

(b) Draw Lucy's indifference curves so that they reflect the following preference ordering.

$$c \sim b \succ e \succ a \succ f \sim d \succ g \quad (2)$$

By the way,  $\sim$  means “is as good as”;  $\succ$  means “is strictly preferred to”. So  $x \succ y$  means that  $x$  is strictly preferred to  $y$ .

5. The combination of 4 Barbie Dolls and 3 bottles of whiskey would have Jacob spending all of his income. When Jacob has 4 dolls and 3 bottle of whiskey, he is willing to give up dolls for whiskey at a rate of 3 per bottle. The price of whiskey is \$20/bottle and the price of Barbie Dolls is \$10 each. Explain why or why not (4, 3) is an optimal choice for Jacob. Depict this situation in a diagram.

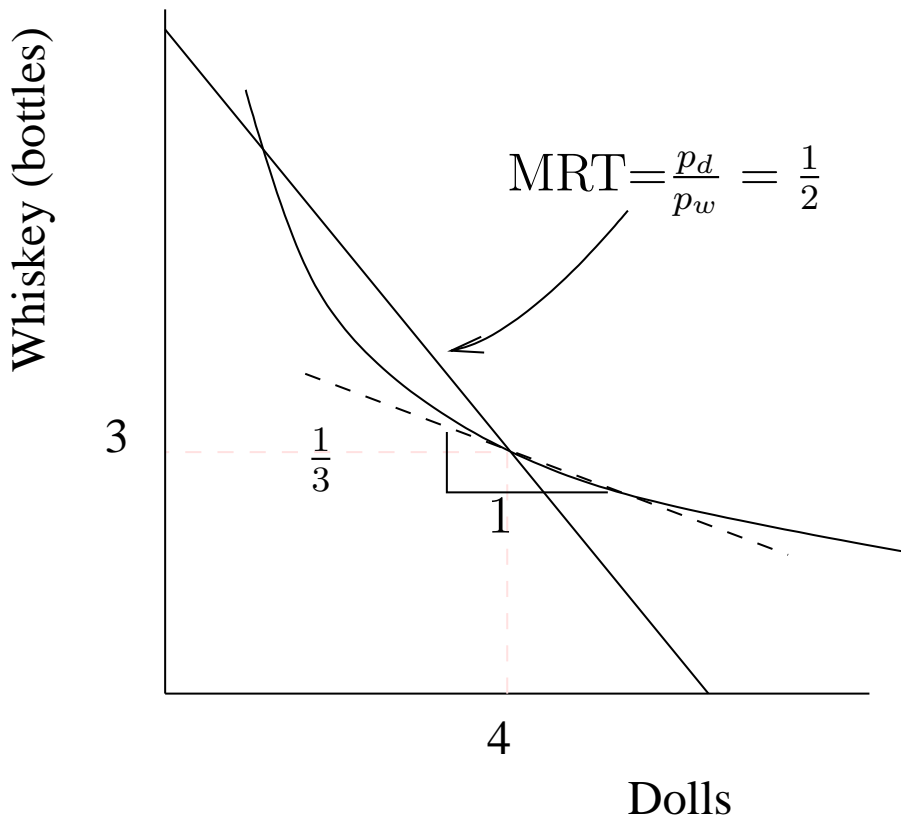


Figure 8. The solid black straight line represents Jacob’s Budget Line. Since he is spending all his money on 4 dolls and 3 bottles of whiskey, that consumption bundle (4, 3) must be on his budget line as shown. The curved line running through that point is a possible indifference curve given what we are told: he is willing to give up dolls for whiskey at the rate of 3 dolls per bottle. (The dashed line tangent to the IC is drawn only to illustrate the point that the slope of the indifference curve has a slope of  $\frac{1}{3}$  at that point. The price ratio,  $\frac{p_{dolls}}{p_{whiskey}}$  is equal to  $\frac{1}{2}$  all along the budget line. This means at the bundle in question, (4, 3), Jacob is willing to give up more dolls for additional whiskey than he has to. Typically this means that he should move along his budget line toward more whiskey and fewer dolls. Hence (4, 3) is probably *not* optimal.