

ECONOMICS 53
 INTRODUCTORY MICROECONOMICS
 In-Class Exercise #4

NAME _____

Question #1

The local mall has a make-your-own sundae shop. They charge customers 35 cents for each fresh fruit topping and 25 cents for each processed topping. Barbara is going to make herself a sundae. The total utility that she receives from each quantity of topping is given by the following tables:

Fresh Fruit Topping	Total Utility	Marginal Utility	MU/\$
1	10	10	28.57
2	18	8	22.86
3	24	6	17.14
4	28	4	11.43
5	30	2	5.71
6	28	-2	-5.71
7	24	-4	-11.43
8	18	-6	-17.43
9	10	-8	-22.86
10	-6	-16	-45.71

Processed Topping	Total Utility	Marginal Utility	MU/\$
1	10	10	40
2	20	10	40
3	10	-10	-40
4	0	-10	-40
5	-10	-10	-40
6	-20	-10	-40
7	-30	-10	-40
8	-40	-10	-40
9	-50	-10	-40
10	-60	-10	-40

- (a) Complete the two tables above.
 (b) If money is no object, how many fresh fruit toppings and processed toppings will Barbara purchase to maximize utility?

Barbara gets the most utility from 5 Fresh Fruit Toppings (total utility =30) and from 2 processed toppings (total utility = 20). Her total utility will be 50 units.

(c) Of the two toppings, which would Barbara purchase first? Explain.

Her first decision is whether she should purchase her first topping as fresh or processed. We see that the MU/P for fresh fruit is equal to 28.57 which is less than the MU/P for processed topping which is equal to 40. Barbara would get more happiness consuming processed topping as her first choice. Thus Barbara would purchase processed topping first.

(d) If Barbara has \$1.55 to spend on her sundae, how many fresh fruit toppings and processed toppings will she purchase to maximize utility?

Barbara will continue purchasing toppings using the same decision process outlined above.

Her first two toppings will be processed since they generate a higher MU/P than fresh fruit toppings.

After the 2nd topping, however, Barbara will prefer fresh fruit toppings. She can afford to purchase 3 fresh fruit toppings after she purchased her initial 2 processed toppings.

The bundle that will maximize her utility given her budget constraint is: 3 fresh fruit toppings and 2 processed toppings.

Question #2

Natasha derives utility from attending rock concerts (R) and from drinking colas (C).

The marginal utility of cola (MU_C) and the marginal utility of rock concerts (MU_R) are given as follows:

$$MU_C = 0.9C^{-0.1}R^{0.1}$$

$$MU_R = 0.1C^{0.9}R^{-0.9}$$

If the price of cola (P_C) is \$1 and the price of concert tickets (P_R) is \$30 and Natasha's income is \$300, how many colas and tickets should Natasha buy to maximize utility?

(Hint: Use the fact that in general $\frac{X^A}{X^B} = X^{A-B}$)

The marginal rate of substitution is equal to the ratio of the marginal utilities of the goods. Thus:

$$MU_C/MU_R = (.9c^{-.1}r^{.1})/(.1c^{.9}r^{-.9}) = P_C/P_R = 1/30$$

Solving these equations simultaneously for c and r yields C = 270 and R = 1.