

Microeconomics I

Problem Set 2

1. Bob likes both Cheerios and Golden Grahams. He is always willing to give up 1 ounce of Cheerios for exactly 2 ounces of Golden Grahams, regardless of how much of each type of cereal he consumes. He has \$10 to spend on these two brands. The price of 1 ounce of Cheerios is \$1 and the price of 1 ounce of Golden Grahams is \$0.80. What is Bob's optimal consumption of each type of cereal? What is his MRS at the optimal bundle?

2. In her communications course, Nancy takes two examinations. Her overall grade for the course will be the maximum of her scores on the two examinations. Nancy decides to spend a total of 400 minutes studying for these two examinations. If she spends m_1 minutes studying for the first examination, her score on this exam will be $x_1 = \frac{m_1}{5}$. If she spends m_2 minutes studying for the second examination, her score on this exam will be $x_2 = \frac{m_2}{10}$.

a) Draw a "budget line" showing the various combinations of scores on the two exams that she can achieve with a total of 400 minutes of studying. On the same graph, draw two or three "indifference curves" for Nancy. On your graph, find the point on Nancy's budget line that gives her the best overall score in the course.

b) Given that she spends a total of 400 minutes studying, which values for x_1 and x_2 Nancy is going to choose?

3. You receive from your parents 180 euros per month to cover living expenses. You spend the entire amount on pizzas (P) and phone calls (C). These two goods enter your utility function in the following way: $U(P, C) = 3P^2C + 100$, where P is number of pizzas consumed, and C is the number of hours of phone calls. The price of one pizza is 8 euros, whereas the price of one hour of phone calls is 2 euros.

a) How many pizzas and hours of phone calls will you optimally consume?

Now your parents no longer send you the 180-euro monthly check. Instead, they send you 20 coupons that you can trade for one pizza each, plus a 20-euro check per month. You can not use the coupons to pay your phone bill.

b) Has your optimal bundle changed? If so, what is your new optimal bundle? How do you know? Are you better off or worse off than before?

c) Redo part b) if what your parents send you is 5 coupons plus a 140-euro check per month.

4. George has 49 euros which he decides to spend on x and y . Commodity x costs 5 euros per unit and commodity y costs 11 euros per unit. He has the utility function $U(x, y) = 3x^2 + 6y^2$. George will choose:

a. only y .

b. some of each commodity but more x than y .

- c. only x .
- d. some of each commodity but more y than x .
- e. equal amounts of the two commodities.

5. Lou has preferences on wine and cheese, and his income is \$5. In shop A , the price of wine is \$0.50 per gallon, and the price of cheese is \$0.50 per ounce. Facing those prices, his optimal bundle includes 4 ounces of cheese. In shop B , he has to pay an entry fee of $\$F$ and prices are \$0.3 per gallon of wine and \$0.4 per ounce of cheese. These two shops are his only feasible choices.

a) If $F = 1.5$, which shop will he choose to enter? Justify your answer graphically.

a) If $F = 1.8$, which shop will he choose to enter? Justify your answer graphically.

6. The only frozen yogurt shop in town is being closed down by city ordinance. Before that, Jerry has one last chance to buy his favorite flavors: chocolate and raspberry. He surveys the prices offered at the shop and purchases his best affordable combination of the two flavors (you may assume he purchases strictly positive amounts of both flavors and that he has no money left after he leaves the shop). The shop doors close behind him for the last time as he heads home to store the yogurt in his freezer. On the way home, he runs into Newman who has secretly been hoarding pints of both types of yogurt. Newman makes Jerry the following offer: he will buy from or sell to Jerry as many pints of the two flavors Jerry wishes to transact. The catch is that Newman's price for raspberry yogurt is more than the price Jerry paid at the shop. The price of chocolate is the same. Will Jerry do business with Newman? Explain your answer.

7. John will only live for two periods. In the first period, he will earn 75,000 euros. In the second period, he will retire and live on his savings. His utility function is

$$U(C_1, C_2) = 2\ln(C_1) + \ln(C_2)$$

where C_1 is consumption in period 1 and C_2 is consumption in period 2.

Assume first he can neither borrow nor lend. If this is the case, his period 2 consumption is at most his period 1 savings.

a) What is his optimal consumption in periods 1 and 2? Will he save any money in period 1?

Now assume he can borrow and lend at an interest rate $r > 0$.

b) Relative to your answer to part (a), will his period 1 consumption increase, decrease or stay the same? Justify your answer.

c) Would an increase in the interest rate make him consume more or less in the second period? Justify your answer.