**Econ 301**
**Intermediate Microeconomics**
**Prof. Marek Weretka**

## Problem set 1
(due Thursday, February 2nd, before the class)

### Problem 1. (Chapter 1)
Question 4 from Chapter 1, Varian (our textbook), pp. 19.

Note: I did not cover Chapter 1 in class. You are expected to read Chapter 1 carefully and solve this problem.

### Problem 2. (Murphy's budget set)
Murphy spends his total monthly income of $100 on two commodities: french fries and beef jerky. The price of a portion of french fries is $2 and beef jerky is $5 (per pack).

a) Write down Murphy's budget constraint.

b) Find the maximal consumption of french fries (this number is called a real income in terms of french fries)

c) Find the maximal number of packs of beef jerky possibly consumed by Murphy (a real income in terms of beef jerky)

d) In a two-dimensional coordinate system, in which beef jerky is measured on the vertical axis and french fries on the horizontal one, draw a red budget line. Using pencil, show all the bundles that are affordable (the budget set). Where can we find the quantities you found in a) and b) on the graph?

e) What is the slope of the budget line? How would you interpret it?

f) Because of the Mad Cow Disease, the price of beef jerky increases to $10 (due to the smaller supply of beef). On a separate graph, plot show how the Murphy's budget set is affected? Is the shift parallel? What is the new relative price of french fries in terms beef jerky?

g) Because of severe shortages in the supply of beef, a "Jerky" Bill is passed by US Congress, allowing each consumer to purchase at most 5 packs. Show on the graph how the new legislation affects Murphy's budget set.

### Problem 3. (Budget set with taxes)
Amy receives a yearly stipend of $2000 from the UW-Madison. She spends it on milk ($1 per bottle) and punk rock CDs ($20 each).

a) What is the relative price of a CD is terms of milk?

b) Draw Amy's budget set (CD on the horizontal axis).

c) In order to reduce noise in Madison area, the governor of Wisconsin imposes an ad valorem sales tax on punk rock CDs, with the rate of 100%. How is Amy's budget set altered by the new regulation? What is the new relative price of CD?

d) Amy's sister Priscilla currently living in California, after learning about a new tax in Wisconsin, decides to help Amy, by sending her 5 CD. Draw Amy's new budget set, taking into account the present from California (assume that the tax still holds).

### Problem 4. (Indifference Curves)
Use a coordinate system with ice cream measured on the horizontal axis and chocolate on vertical one to illustrate your preferences by plotting indifference curves if

a) you like both ice cream and chocolate a lot.

b) You like ice cream, but you hate chocolate

c) You like ice cream, but you do not care (you are indifferent) about the chocolate

e) You always eat ice cream and chocolate in the same proportion (1:1)

d) What is the sign of MRS in each of the first three cases?

## Problem 5.  (Convexity and monotonicity)

a) Consider Figure 3.4 (pp. 40) from Varian. Are the preferences depicted in this graph convex? Strictly convex? Monotone? Justify your answer using the graphs.

b) Repeat the same exercise for preferences deoicted in Figure 3.7 (pp. 43).