

## Problem set 2

"due" 9/30/09

**Problem 1** Arthur spends his income on bread and chocolate. He likes chocolate, but is neutral towards bread, in that he doesn't care if he consumes it or not. Sketch Arthur's indifference curve map over bread and chocolate

**Problem 2** Jack has an income of \$100 and spends his money on apples (price \$1) and bananas (price \$.50). His utility function is given by  $u(A, B) = \sqrt{AB}$ .

a. Sketch Jack's budget line and three of his indifference curves. Make sure to include the indifference curve on which Jack's utility-maximizing bundle lies.

b. Suppose that, in a sudden burst of inflation, all prices and incomes in the economy double. Thus, apples now cost \$2, bananas \$1, and Jack now makes \$200. Redraw the picture from part A. Does Jack's new optimal bundle involve more or fewer apples?

**Problem 3** On a diagram with gasoline on the horizontal axis and spending on all other goods on the vertical axis, what happens to the budget line if the government imposes a \$1/gallon tax on gasoline but does not tax other goods?

b. What happens to the budget line if the tax applies only to purchases of gasoline in excess of 10 gallons/week?

**Problem 4** Suppose that Boston consumers pay twice as much for avocados as for tangerines, whereas San Diego consumers pay half as much for avocados as for tangerines. Assuming that consumers maximize their utility, which city's consumers have a higher marginal rate of substitution of avocados for tangerines? Explain your answer.

**Problem 5** The local swimming pool charges nonmembers \$10 per visit. If you join the pool, you can swim for \$5 per visit, but you have to pay an annual fee of \$F.

a. Suppose you have an income of \$100. Draw an indifference curve diagram to graphically determine the value of F such that you are indifferent between joining and not joining. Put number of swimming pool visits on the horizontal axis and dollars spent on all other goods on the vertical axis.

b. Suppose the pool charged you exactly that F. Would you go to the pool more or fewer times as a member than as a nonmember?

c. Suppose your utility function is  $u(P, X) = P * X$ , where P is number of pool visits, and X is dollars spent on all other things. Solve for F mathematically.

**Problem 6** David's utility function is  $u = B + 2Z$ . Describe the location of his optimal bundle in terms of the relative prices of B and Z.

**Problem 7** Vasco's utility function is  $U = 10X^2Z$ . This means  $MU_X = 20XZ$  and  $MU_Z = 10X^2$ . The price of X is \$10, while the price of Z is \$5. Vasco's income is \$150.

a. What is his optimal consumption bundle?

b. Show your answer in a carefully labeled graph.