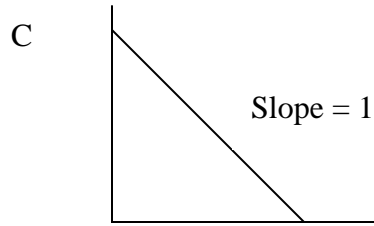


Homework 2 Preferences and Budget Constraints  
Answer Key

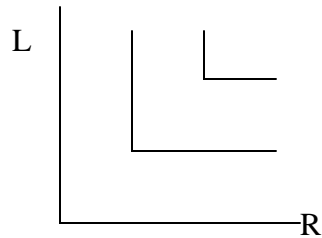
PREFERENCES

1. Draw indifference curves to represent each of the following situations

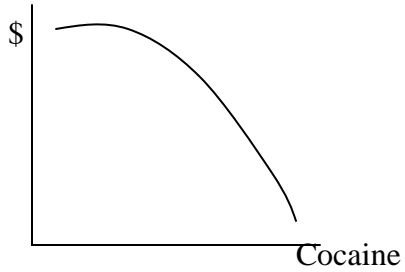
a) The two goods are Coke and Pepsi. The individual can't tell the difference



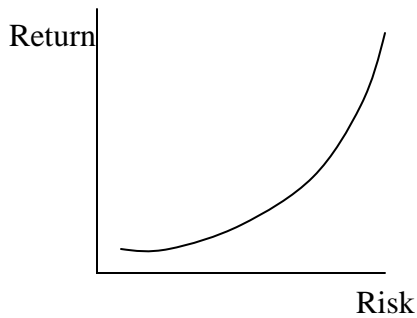
b) The two goods are left and right shoes.



c) The two goods are money and cocaine. The more cocaine an individual consumes, the more money they are willing to give up to get more.



d) Financial assets (like a stock portfolio) get a financial return, but are associated with a certain amount of risk. Less risk is better than more risk. Draw indifference curves for assets with different levels of risk and return.



2. Max prefers:

Who-Hash	to eggs, sausage & Spam
eggs, sausage & Spam	to green eggs & ham
green eggs ham	to linguini & clams
linguini & clams	to Who-Hash

a) What basic assumption about consumer preferences does this violate?

Transitivity

b) Cindy-Lou tries to convince Max that he is irrational, but he insists that in each two-meal comparison above, the value of his more-preferred meal is at least \$1 more than the value of his less-preferred meal. Advise Cindy-Lou on how she might make money by taking advantage of Max's preferences.

Assume Cindy Lou has each of the meals to start out with, and that Max is starting out with Who-Hash. Max like linguini with clams better than Who Hash and one dollar. He is willing to give Cindy Lou hi Who-Hash + \$1 to get linguini. But he is also willing to then trade her linguini + \$1 to get green eggs. And he is willing to trade his green eggs+ \$1 to get eggs and sausage. And he will trade that + \$1 to get Who-hash. But we already know he'll give that + \$1 to Cindy Lou to get linguini. And so his preferences cycle until Cindy Lou has taken all of his money.

3. Clara's utility function is  $U = x_A x_B$ .

a) She likes consuming 10 apples and 10 bananas as much as consuming 1 apple and how many bananas?

$$U = (10)(10) = 100 = 1(100) \\ X_B = 100$$

b) Does this mean her preferences violate the assumption of convexity?

No. She is indifferent between the two bundles.

### BUDGET CONSTRAINTS

4. If you could afford exactly 6 apples and 14 bananas, or 10 apples and 6 bananas, then if you spent all of your income on bananas, how many bananas could you buy?

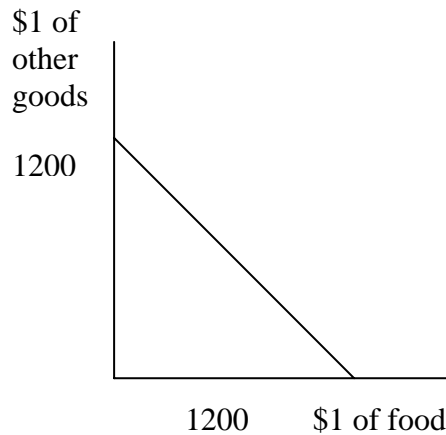
$$M = P_A A + P_B B = P_A 6 + P_B 14 = P_A 10 + P_B 6$$

-->  $4P_A = 8P_B$  -->  $P_A = 2P_B$  The price of apples is twice the price of bananas. You can also see this if you plot the points and find the slope.

So if I give up 6 apples, I can buy 12 bananas (bananas only cost me half as much). Taking the first bundle, this means that instead of buying 6 apples and 14 bananas, I can buy  $14+12=26$  bananas and no apples.

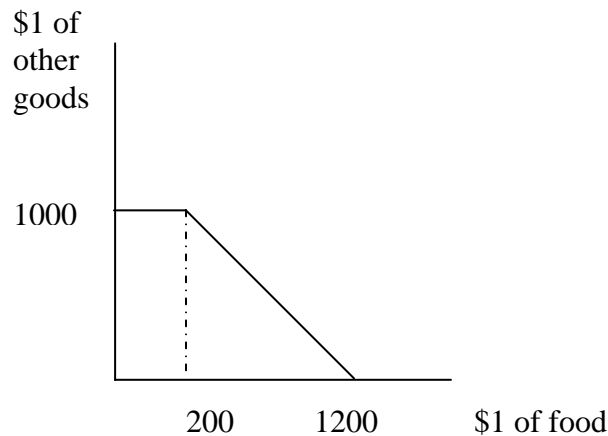
5. The Smith family has \$1000 per month to spend on food and other things. Write equations for each of the following budget constraints and graph them. (Note: some equations or lines may have multiple parts.)

- b) They are given \$200 in welfare payments.



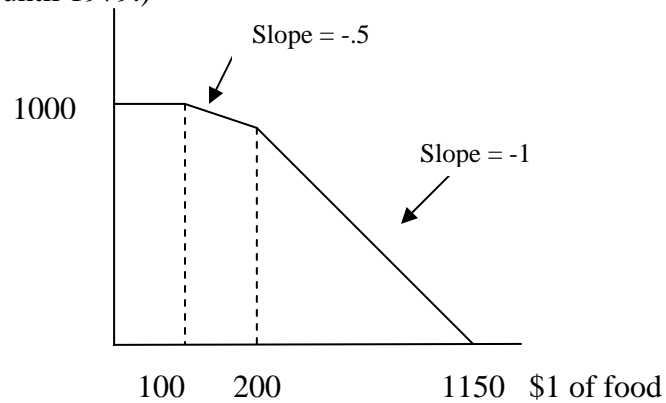
Think of the price of food (F) as \$1 and the price of other things (O) as \$1.  
 $1200 = 1 \cdot O + 1 \cdot F$

- c) They are given \$200 in food stamps, which cannot be sold.



$1200 = 1 \cdot O + 1 \cdot F$  if  $200 < F < 1200$   
 $1000 = O$  if  $F < 200$

d) They are given \$100 in food stamps and the option to buy another \$100 of food stamps at the price of 50¢ per \$1 of food stamps (This was the actual government policy until 1979.)

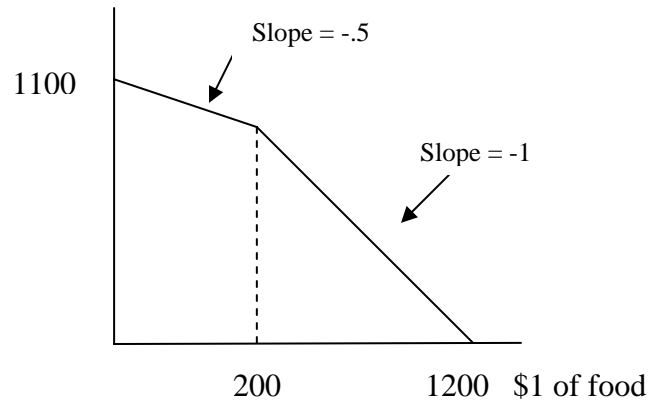


$$1000 = O \text{ if } F < 100$$

$$1050 = O + .5F \text{ if } 100 < F < 200$$

$$1150 = O + F \text{ if } 200 < F < 1150$$

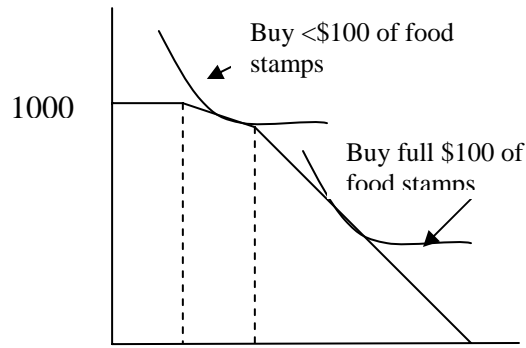
e) They are given \$200 in food stamps, but each \$1 of food stamps can be sold on the black market for 50¢.



$$1100 = O + .5F \text{ if } 0 < F < 200$$

$$1200 = O + F \text{ if } 200 < F < 1200$$

f) Use indifference curves to show that the Smith family's preferences determine if they will take advantage of the option to purchase food stamps in part c.



Note that these preferences can't belong to same family.

\$1 of food

6. Charlie has a utility function  $U = x_A^2 x_B$ . He has \$100 to spend on apples and bananas. Apples cost \$1, bananas cost \$2.

- a) What is his budget constraint?

$100 = 1x_A + 2x_B$  The graph with  $x_B$  on the y axis will have a y intercept of 50, an x intercept of 100, and a slope of  $-1/2$

- b) What is his marginal utility of apples?

$$MU_A = 2x_A x_B$$

- c) What is his marginal utility of bananas?

$$MU_B = x_A^2$$

- d) What is a mathematical expression for the slope of his indifference curves?

$$MRS = MU_A/MU_B = (2x_A x_B) / (x_A^2) = 2x_B/x_A$$

If you took the next step and found the optimum, the slope of the ICs at the optimum is equal to the price ratio  $-P_a/P_b = -1/2$