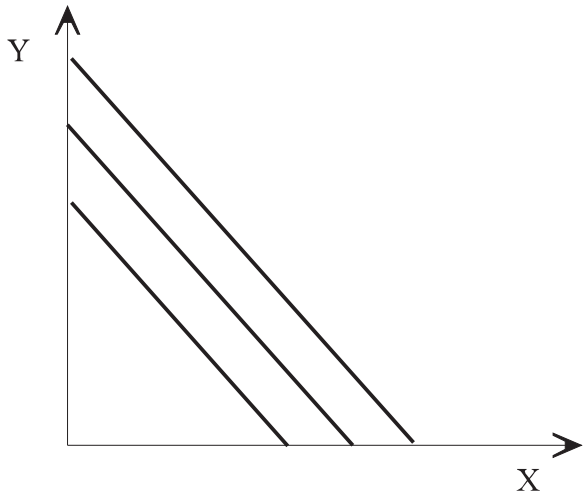
Short Questions

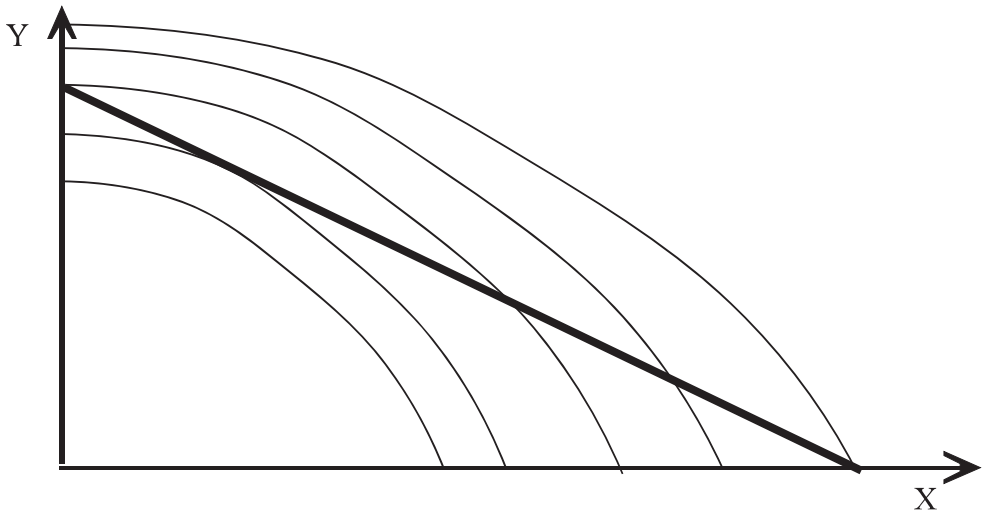
1. Consider an individual whose preferences for goods X and Y are given by the following set of indifference curves.



a. Is the utility function of this person Cobb-Douglas, Leontieff, or Linear Utility?

b. Suppose the budget constraint of this individual is steeper than the indifference curves. Will this person consume only good X, only good Y, or some of both goods?

2. One budget constraint (the thick straight line) and a few indifference curves (thin curved lines) are plotted in the figure below. Both goods, X and Y are desirable to the consumer, i.e., utility is higher for indifference curves that are further from the origin.



a. In the above figure, clearly indicate and label the utility maximizing choice of consumption levels of X and Y.

b. Which of the following expressions are (or is) true at the utility maximizing choice of consumption? Circle the ones that are known to be correct on the basis of the above figure.

$$\frac{MU_X}{P_X} < \frac{MU_Y}{P_Y} \qquad \frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} \qquad \frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$$

$$MU_X < MU_Y \qquad MU_X = MU_Y \qquad MU_X > MU_Y$$

$$P_X < P_Y \qquad P_X = P_Y \qquad P_X > P_Y$$

c. How would this choice of consumption change if the price of Y decreases by a little bit? Would the consumption of Y increase, decrease, or stay the same? How would the consumption of X change?

d. Answer the questions in (c) if instead the price of Y increased by a little bit?

Problems

1. A consumer's utility from the consumption of French and California wine is given by:

$$U(C,F) = C + F$$

a. Plot the indifference curve of this consumer that corresponds to, say, utility level 5 with quantity of California wine on the vertical axis and French wine on the horizontal axis. Label all points and slopes.

b. Suppose that this consumer wants to spend 100 dollars on wine, and that French wine costs 10 dollars per bottle while California wine costs 5 dollars per bottle. Draw this consumer's budget constraint for consumption of wine with the quantity of California on the vertical axis and French wine on the horizontal axis. Label all points and slopes.

c. How much California and French wine will this consumer buy ? Show your answer diagrammatically using the budget constraint and an indifference curve.

2. A consumer's utility from consumption during his working years and consumption during his retirement years is given by:

$$U(C_W,C_R) = 5\ \log(C_W) + \log(C_R)$$

where C_W and C_R indicate his consumption in thousands of dollars during the work years and retirement years, respectively. The consumer earns a total of 600 thousand dollars during his work years. He can put any amount of this money in a bank that earns NO interest, and withdraw this money for consumption during his retirement years.

a. If he saves 100 in the bank during his working years, what will C_W and C_R be ? What if he saves 200 in the bank ? In general, what will his consumption be if he saves S dollars ?

b. What will his utility be if he saves S dollars during his working years ?

c. What choice of savings will maximize this consumer's utility ?

d. Suppose now that the government is taxing this consumer 50 thousand dollars during his working years which it gives back to him as social security payments during his retirement years. What would C_W and C_R be now, if he saves 100 during his working years ? What if he saves 200 ? In general, what will his consumption be if he saves S dollars ?

e. What will his utility be if he saves S dollars during his working years ? [Don't forget that he

is being taxed part of his income, which he gets back as social security payments.]

f. What choice of savings will maximize this consumer's utility ?

g. What is the effect of the social security program to this consumer's savings ? What is the effect to this consumer's utility ?

3. A consumer's utility from the consumption of French and California wine is given by:

$$U(C,F) = C + F$$

a. Plot the indifference curve of this consumer that corresponds to, say, utility level 5 with quantity of California wine on the vertical axis and French wine on the horizontal axis. Label all points and slopes.

b. Suppose that this consumer wants to spend 100 dollars on wine, and that French wine costs 10 dollars per bottle while California wine costs 5 dollars per bottle. Draw this consumer's budget constraint for consumption of wine with the quantity of California on the vertical axis and French wine on the horizontal axis. Label all points and slopes.

c. How much California and French wine will this consumer buy ? Show your answer diagrammatically using the budget constraint and an indifference curve.

d. How high must the price of California wine go before the consumer is indifferent between California and French wines ?

e. How much money would the consumer be willing to spend in order to avoid the price increase that was your answer in (d.) ? [You need no more than 2 lines of calculations here, and perhaps a sentence of English or two.]

4. Georgia always eats hot dogs together with 1 oz. of mustard. Each hot dog eaten in this way provides 15 units of utility, but any other combination of hot dogs and mustard is worthless to Georgia. [If she has an excess of one of the ingredients than these proportions, she will just throw the extra amount away.]

a. Draw a couple of Georgia's indifference curves for consumption of hot dogs and mustard, with the number of hot dogs on the vertical axis.

b. Suppose she has $5.50 to spend on hot dogs and mustard, and that hot dogs cost $1 each, while mustard costs $0.10 per ounce. Draw her budget line, with the number of hot dogs

indicated on the vertical axis. Label all intercepts on your graph.

c. Combine the two graphs above to show Georgia's utility maximizing consumption of these two items, given her budget constraint.

d. Algebraically derive how many hot dogs and mustard she will buy. Label this consumption bundle on the graph.

5. Georgia always eats hot dogs together with 2 oz. of mustard. Each hot dog eaten in this way provides 10 units of utility. If she has an excess of one of the ingredients than these proportions, she will just throw the extra amount away.

a. Draw a couple of Georgia's indifference curves for consumption of hot dogs and mustard, with the number of hot dogs on the vertical axis. Label your graph carefully.

b. Suppose she has $30 to spend on hot dogs and mustard, and that hot dogs cost $1.5 each, while mustard costs $0.20 per ounce. Draw her budget line, with the number of hot dogs indicated on the vertical axis. Label all intercepts on your graph.

c. Algebraically derive how many hot dogs and mustard she will buy. [Quantities do not have to be integers.] Label this consumption bundle on a graph that combines the budget constraint and the indifference curve that corresponds to the optimal consumption bundle.

6. Consider a person preparing hamburger patties for a Memorial Day barbecue. He can use either regular ground beef or extra lean ground beef. His utility function for these two types of beef is given by:

$$U = 4L + 3R$$

where L is the amount of lean ground beef he purchases and R is the amount of regular ground beef he purchases. In other words, these two types of beef are perfect substitutes, but, all things equal, he prefers lean to regular beef.

a. Does this person prefer 4 pounds of lean beef to 3 pounds of regular beef ? Show why or why not ?

b. In terms of this person's utility function, how many units of regular beef are equivalent to one unit extra of lean beef ?

c. Suppose extra lean beef costs $3.29 per pound and regular beef costs $2.89 a pound. Will this person purchase only extra lean beef, only regular beef, or a combination of the two ?

d. Suppose he has $14 to spend on meat. How many pounds will he purchase ? [Give your answer to 2 decimals.]

7. A consumer's utility of cappuccinos and lattes is given by $U(L,C) = 2L + 3C$. The price of either of the two drinks at Espresso Royale is equal to $3, and the person spends $30 on coffee.

a. Draw this consumer's budget constraint in a figure with *L* on the vertical axis and *C* on the horizontal axis

b. Draw two indifference curves for this consumer with L on the vertical axis and C on the horizontal axis.

c. How many lattes and how many cappucinos will this consumer purchase?

d. Suppose the person visits Italy, and cappuccinos there cost $4, while lattes still cost only $3. Will the person switch to lattes? Why or why not?

8. A consumer's utility of hot dogs and burgers is given by $U(H,B) = 2H + 3B$. The price of a hot dog is 2 and the price of a burger is P_B. The consumer has 12 to spend on hot dogs and burgers, that is, his (relevant) income is 12.

a. Suppose $P_B = 4$. Draw this consumer's budget constraint in a figure with *H* on the vertical axis and *B* on the horizontal axis

b. Draw two indifference curves for this consumer with H on the vertical axis and B on the horizontal axis.

c. How many burgers and how many hot dogs will this consumer purchase if $P_B = 4$?

d. How many burgers and how many hot dogs will he purchase if the price of each hot dog increases to 3 and the price of burgers remains equal to 4?