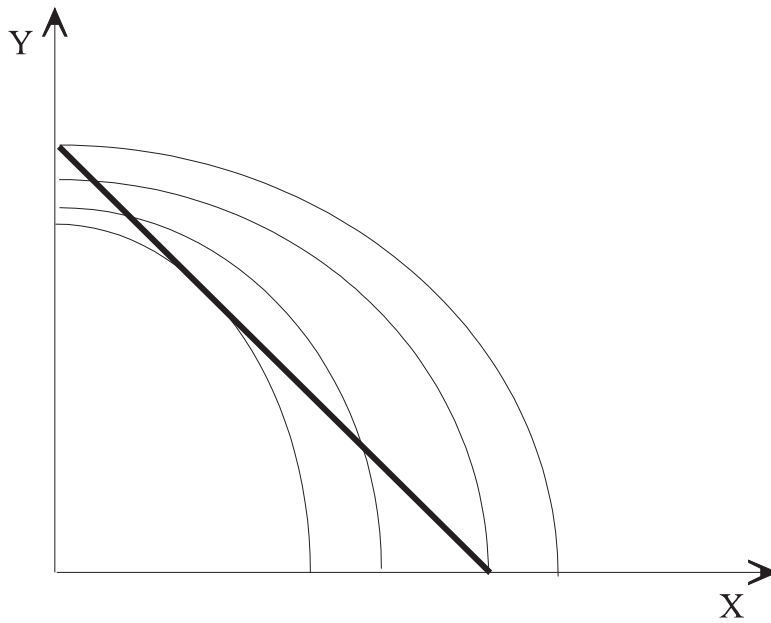**Short Questions**

1. In the figure below, the budget constraint is drawn with a bold line. A set of indifference curves is drawn in regular width. Finally, utility is increasing in both *X* and *Y*, i.e., indifference curves that are further out from the origin correspond to higher utility.

On this figure, label the combination of *X* and *Y* that maximizes this consumer's utility.

2. Suppose a tourist budgets B dollars for a trip. His utility in terms of the number of days he spends on the trip, *D*, and the quality of the hotel he stays, *S*, is given by the utility function

$$U(D, S) = (\alpha + D^\beta + S^\gamma)^\sigma$$

The daily rate in a hotel of quality *S* is $P = S^2$. There are no other expenses.

This tourist chooses *D* and *S* to maximizes his utility subject to his budget constraint.

a. Write the tourist's budget constraint.

b. Write the Lagrangian expression associated with the consumer's utility maximization problem *in terms of the tourist's decision variables*.

Problems

1. A consumer has utility function for goods X and Y given by

$$U(X,Y) = X^{0.4} \, Y^{0.6}$$

a. What is the consumer's marginal utility for X ? What is his marginal utility for Y ?

b. Suppose the price of X is equal to 2 and the price of Y equal to 6. What is the utility maximizing proportion of X and Y in his consumption ? [That is, if he is a utility maximizer, how many units of X will he consume in terms of units of Y that he consumes.]

c. If the total amount of money he is willing to spend on the two goods is equal to 60, how much of each will he consume ?

2. Consider an individual with income I and utility function

$$U(X, Y) = \alpha \, X^{\frac{1}{2}} + b \, Y^{\frac{1}{2}}$$

where X and Y are two products. This utility function has indifference curves that exhibit diminishing MRS which goes to zero and infinity as they touch the x and y-axis. Therefore, one can use the standard calculus-based approaches to compute the utility maximizing choice of X and Y. The current price of X is 2 and the current price of Y is 4.

a. What is this consumer's budget constraint?

b. Calculate the optimal consumption of X and Y if the consumer has income I.

3. (Slightly different version of problem 1.) A consumer has utility function for goods X and Y given by

$$U(X,Y) = X^{0.2} \, Y^{0.3}$$

a. What is the consumer's marginal utility for X ? What is his marginal utility for Y ?

b. Suppose the price of X is equal to 4 and the price of Y equal to 6. What is the utility maximizing proportion of X and Y in his consumption ? [That is, if he is a utility maximizer, how many units of X will he consume in terms of units of Y that he consumes.] Use any

appropriate method you like to answer this question.

c. If the total amount of money he is willing to spend on the two goods is equal to 60, how much of each will he consume ?