PROBLEM SET 2

ETHAN LIGON

Questions marked (**T,F,U**) should be answered "True," "False," or "Uncertain," and your answer should be briefly justified. Note that points will be awarded based only on your reasoning, not on the answer itself, even if correct.

(1) (**T,F,U**) A rational consumer should have infinite demand for a good if it is free.

(2) (**T,F,U**) A sharp rise in the price of gasoline would be unlikely to last very long; after all, the rise in price would lead to a fall in demand, and this fall in demand would then cause the price to fall.

(3) (**T,F,U**) "Housing Prices Surge"(SJ Mercury, May 26th, 2000). On the same day, San Francisco Chronicle had an article with the headline "Sharp Drop in Bay Area Home Sales". Though home sales are down, prices continue to rise. This phenomenon is in apparent violation of the law of supply and demand.

(4) (**T,F,U**) By the axiom of transitivity, the slope of the indifference curve is always negative.

(5) Consider an economy with two consumers, A and B, and two goods, X and Y, consumer A has 100 dollars and consumer B has 200 dollars. The price is X is 4 dollars each while B costs 5 dollars each. A's preferences can be described by the utility function:

$$U^A = X + Y$$

B's preferences can be described by the utility function:

$$U^B = X * Y$$

What is the marginal rate of substitution between two goods for each consumer? Calculate the amounts of X and Y each of these consumers will purchase if each is trying to make her as well off as possible. Explain the economics of what you are doing.

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(6) The table below shows complete data for buyers and sellers of a given commodity. Each buyer and seller in the market is assumed to supply or demand a single unit of the good. The sellers column shows the number of sellers in the market at each possible production cost level. Likewise, the buyers column shows the number of buyers in the market at each possible subjective valuation of the good.

Value	Sellers	Buyers
$2	6	6
$4	6	6
$6	6	6
$8	6	4
$10	6	6

a) Draw the graph like the one shown in lecture to show the market supply and demand curves. Your graph should show intersecting supply and demand curves. Each should have a stair-step appearance, with the right end of each step reflecting the accumulated level of supply or demand for the corresponding price level.

b) Find the market equilibrium price and quantity. Is the resulting allocation efficient? Explain.

c) Suppose a unit tax is imposed on buyers. Find the new equilibrium price and quantity.

(7) Suppose the utility function for two goods, X and Y, has the Cobb-Douglas form:

$$U(X, Y) = \sqrt{10XY}$$

a) Graph the U=10 indifference curve associated with this utility function

b) If X=4, what is the marginal rate of substitution(MRS) at this point?

c) In general, develop an expression for the MRS for this utility function. Show that is can be interpreted as the ratio of the marginal utilities for X and Y.

d) Consider a logarithmic transformation of this utility function:

$$W = \log U(X, Y)$$

where log is the logarithmic function to base 10.

Develop a general expression for the MRS for this utility function. Comment on the differences with respect to the MRS found in part **??**.

e) Show that for this transformation the W=1 indifference curve has the same properties as the U=10 curve calculated in parts (a) and (b). What is the general expression for the MRS of this transformed utility function?