The Digital Economist

Intermediate Microeconomic Theory
Worksheet #2: **Utility and Preferences** Name:_____

_____

1a. Calculate the marginal utility for each quantity of the following two goods:

Bread (loaves)			**Tea** (Cups)		
Q_{week}	Utility	MU	Q_{week}	Utility	MU
0	0		0	0	
1	70		1	60	
2	130		2	110	
3	180		3	150	
4	220		4	180	
5	250		5	200	
6	270		6	210	
7	280		7	210	
8	280				

b. Does the Marginal Utility of these two goods *increase*, *decrease*, or *remain constant* with additional units of consumption?_____

Is this consistent with our assumptions about (cardinal) utility?_____

Explain:_____

c. Assuming that you can trade one loaf of bread for one cup of tea ($P_{bread} = P_{tea}$), complete the following table assuming that you currently have 8 loaves of bread (your income) and no tea.

Bread	Tea	MU_{loss}	MU_{gain}	MU_{net}	Total Utility
8	0	-	-	_____	_____
7	1	_____	_____	_____	_____
6	2	_____	_____	_____	_____
5	3	_____	_____	_____	_____
4	4	_____	_____	_____	_____
3	5	_____	_____	_____	_____
2	6	_____	_____	_____	_____

d. At what combination of bread and tea will the consumer stop trading in order to maximize his/her utility from consumption of these two goods?

Bread:_____ Tea:_____

Explain:_____

_____

2. Given the following Utility function for two goods 'X' & 'Y':

$$\mathbf{U} = 3X^{0.5}2Y,$$

the marginal utilities of X & Y are:

$$MU_x = \frac{d\mathbf{U}}{dX} = 3Y/X^{0.50}$$

$$MU_y = \frac{d\mathbf{U}}{dX} = 6X^{0.5}$$

a. Derive an expression for the Marginal Rate of Substitution: MRS_{xy}

b. Given a consumption bundle of X & Y = (4,6), what is the value of the MRS_{xy}?

c. Which of the following price combinations correspond to a

consumer equilibrium given the results of part 'b'?_____

	P_x	P_y
A.	1	6
B.	3	4
C.	6	2
D.	1	3

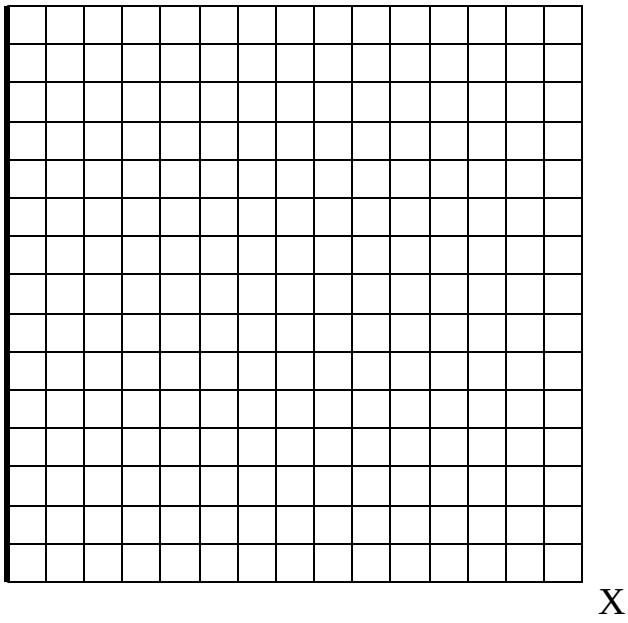
d. If consumption of good 'X' falls to one unit (X = 2), how many units of good 'Y' are required to hold the level of utility constant?

e. Given this change in the consumption bundle for goods 'X' & 'Y', has the MRS_{xy} increased or decreased?_____

3. A consumer has preferences represented by the following function:

$$\mathbf{U} = XY$$

a. Graph these preferences below for a constant level of utility of 24 utils:



b. Given the following income and prices:

I = $24
P_x = $3
P_y = $2,

derive an equation for the budget constraint and plot this constraint on the diagram above.

c. Find the point of consumer optimum. What is the MRS at this point?

4. Given the following Utility function: $\mathbf{U} = X^{\alpha}Y^{\beta}$

and budget constraint: $I = P_xX + P_yY$

a. Calculate the corresponding Marginal Utilities for these two goods:

b. What restrictions can we make on the range of values for 'α' & 'β' given our assumptions of "*more is preferred to less*" and "*diminishing marginal utility*"?

c. Derive an expression for the Marginal Rate of Substitution:

d. Combine the MRS with the prices of these two goods to develop and equation for a(ny) consumer optimum:

e: Using a combination of the condition for a consumer optimum and the budget constraint, derive the demand equations for 'X' and 'Y' as a function of prices and income [i.e., $X = f(P_x,P_y,I)$ & $Y = f(P_x,P_y,I)$]: