

## Additional Problems for Review One

### Section One – Substitution and Income Effects

For each of the following utility functions:

- i. Derive the uncompensated demand function for each good.
- ii. Derive the compensated demand function for each good.
- iii. Use **graphical analysis** to illustrate the substitution and income effects for the following situation:

Assume that the consumer has \$120 of income, and assume that the price of good y is fixed at \$1. Then, assume that the price of good x increases from \$1 per unit to \$2 per unit.

- iv. Use the Slutsky Equation to calculate the substitution and income effects for the situation described in part IV.

1.  $U = xy^2$
2.  $U = \text{Min}[x, 2y]$
3.  $U = \ln x + y$
4.  $U = 3x + 2y$

### Section Two – Applications

1. True/False with Justification - Evaluate the statement below. Determine if it is true or false, and then justify your answer!

*If Sam views pasta as an inferior good, then Sam's compensated demand curve will be flatter than his uncompensated demand curve.*

2. ACME Warehouse Goods is going into business to compete with Sam's Club. However, ACME's executives have decided to try a unique pricing plan. Guests at an ACME store may choose between the following two options:

Plan 1: "The Permanent Guest" – Under this plan guests may shop without joining ACME, but they pay the prices listed on the shelf.

Plan 2: Membership – Under this plan a family pays \$20 per month to be a member of ACME. However, a member receives a 20% discount on every item purchased in the store.

For each of the utility functions listed below, determine whether a representative consumer with these preferences would choose plan 1 or plan 2. Assume that the representative consumer faces a shelf price of \$1 per unit for goods from ACME (good x) and a price of \$2 per unit for all other goods (good y) that the consumer buys at stores other than ACME. Furthermore, you should assume that the representative consumer has \$400 per month to spend on goods.

a.  $U = x^4y$

- b. Challenge Question – What weights would you have to place in a perfect complements utility function to make the consumer indifferent between the two plans?

3. The town of Mooresville is thinking of placing a \$1 per unit tax on movie rentals. However, the town council is very well educated – they have all had several economics courses – and the members of the council are concerned about the economic impact of this tax. For the purposes of analysis they are assuming that each resident in Mooresville has an entertainment budget of \$80 per month. Movie rentals currently cost \$2 each, but attending a movie at the AmStar cinema is \$5. Mooresville residents only consume movie rentals (good  $x$ ), and movies at the cinema (good  $y$ ). Mooresville residents have the following utility function for movies:

$$U = xy^3$$

- a. Find the typical resident's optimal consumption bundle when the tax has not been put in place.
- b. Find the typical resident's optimal consumption bundle when the tax has been put in place.
- c. The town council is worried about how this policy will impact families. Calculate how large of a lump sum transfer the town of Mooresville would have to give families in order to make them just as well off as they were before the tax was implemented. In other words, given that the \$1 tax is in place – how much additional income would a family need to reach its old (pre-tax) indifference curve?
4. Graphically derive an individual's labor supply curve using the labor/leisure model. Does your individual's labor supply curve "bend backwards"? Why or why not?