

ECO 601
Fall 2003
Problem Set #4

Due: Monday, September 29

1. Nicholson, Problem 5.6
2. Ringo has an income of \$24 per week and buys two goods, X and Y. Initially he faces prices $P_x = \$4$ and $P_y = \$2$ and purchases the bundle $X = 5$ and $Y = 2$. Later prices change so that $P_x = \$4$ and $P_y = \$4$. Fortunately Ringo's income increases to \$32. Facing these prices and with his new income, Ringo chooses $X = 2$ and $Y = 6$. Illustrate Ringo's consumption choices in a budget constraint diagram. Does Ringo seem like a rational person to you? Are his consumption choices consistent with the Strong Axiom of Revealed Preference?
3. The Osborne family purchases 75 gallons of fuel oil per month when its price is \$1 per gallon and their income is \$300. The government then agrees to pay half the family's heating bill. With the government subsidy (\$0.50 per gallon), the Osbornes' consumption of fuel oil rises to 100 gallons per month.
 - a) Illustrate what has happened using budget lines and indifference curves. Identify in your diagram the total cost to the government of the subsidy.
 - b) Illustrate the Osborne family's Marshallian demand curve for fuel oil.
 - c) Now using the concept of consumer's surplus, illustrate in your demand curve diagram the benefit to the Osbornes of the subsidy program. In the same diagram, contrast that to the actual cost to the government of the subsidy.
 - d) Suppose that instead of subsidizing the cost of fuel oil, the government gives the Osbornes a lump-sum transfer each month of \$50. Which would the Osbornes prefer, the price subsidy or the lump-sum transfer? Carefully explain your answer using your original diagram with budget lines and indifference curves.
4. Suppose $U(X, Y) = 3X^{1/3}Y^{2/3}$. Suppose also that $I = \$48$, $P_x = \$2$, and $P_y = \$4$.
 - a) Derive expressions for the Marshallian demands for X and Y. How much X and how much Y are demanded under the given conditions?
 - b) Illustrate the utility maximizing bundle of X and Y in a budget constraint-indifference curve diagram. What level is utility?
 - c) Derive expressions for the Hicksian demands for X and Y. (Hint: see pp. 130-131 in Nicholson.)
 - d) Illustrate the Marshallian and Hicksian demand curves for X in a diagram. Use $I = \$48$, $P_y = \$4$, and $U = 24$ in constructing your curves.