

Due: Monday, Oct. 4

1. Albert is a poor undergraduate student majoring in physics. His monthly income is \$100, and he consumes only two goods, Raman noodles (R) and other goods (OG). Initially the price of other goods is \$1 per unit, and the price of Raman noodles is \$1 per package. Albert is a clear-thinking and rational person, and under these conditions he is happiest if he consumes 50 packages of Raman noodles per month. Now, the price of Raman noodles falls from \$1.00 to \$.50 per package. In response, Albert increases his consumption to 70 packages per month.
  - a) Using indifference curves and budget lines, illustrate Albert's initial situation and new situation in a diagram.
  - b) Next month Albert is planning to graduate. He is going to have to pay library fines and parking tickets that will reduce his income from \$100 to \$70. In thinking about how he will spend his \$70 income, he is confident that he will be just as happy when his income is \$70 and the price of Raman noodles is \$.50 as he was when his income was \$100 and the price of Raman noodles was \$1.00. He anticipates that he will want to consume 80 packages of Raman noodles next month. With that information, illustrate the income and substitution effects for Albert when his nominal income is fixed at \$100 and the price of Raman noodles falls from \$1.00 to \$.50 per package.
  - c) Illustrate Albert's Marshallian demand curve for Raman noodles. What is the increase in Albert's consumer's surplus when price falls from \$1.00 to \$.50?
  
2. Erma's utility function is given by  $U = X^{1/2}Y^{1/2}$ .
  - a) If Erma's income is \$2 and she faces  $P_x = $.25$  and  $P_y = $1$ . How much X and Y should Erma consume to Maximize utility? What will her level of utility be? Illustrate in a diagram.
  - b) Suppose  $P_x$  increases to \$1. What happens to Erma's consumption of X? Illustrate in your diagram and also in a demand curve diagram.
  - c) Erma's Hicksian (compensated) demand function is given by  $h_x(P_x, P_y, V) = VP_y^5/P_x^5$ , where V represents the level of utility. Illustrate Erma's Hicksian demand curve for X in the demand curve diagram, and then illustrate the income and substitution effects of the change in  $P_x$  from \$.25 to \$1 in your budget constraint-indifference curve diagram.
  
3. The Hamburglar has a utility function given by  $U = S + \ln B$ , where S represents milkshake consumption and B represents hamburger consumption. He decides to give up his life of crime, and takes a job earning income  $I=6$ . When he purchases burgers and shakes rather than stealing them, he pays prices  $P_S = 2$  and  $P_B = 1$ .
  - a) Calculate the Hamburglar's own-price, income, and cross-price elasticities for both hamburgers and milkshakes. (Hint: you first must derive the Marshallian demand functions for burgers and shakes.)
  - b) Confirm that the Euler Theorem Elasticity Identity holds for both hamburgers and for milkshakes.
  
4. Nicholson, Problem 5.4, p. 154.