

# Econ 701: Problem Set 4

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Due: Tuesday October 6

1. Complete the parts of the last problem set we postponed. Specifically, verify the Slutsky equation for problem 5 and find the Hicksian demands and expenditure function for problem 6.
2. Prove that if preferences are homothetic, then  $D_p x(p, y)$  is a symmetric, negative semidefinite matrix.
3. Consider a consumer who has to pay for goods both in dollars and in “points.” That is, each good has two prices, one in each “currency,” and the consumer has to both *both* prices to get the good. Let  $p_\ell$  denote the dollar price of good  $\ell$  and let  $q_\ell$  denote the point price of good  $\ell$ . The consumer has  $w$  dollars and  $I$  points. Assume his preference is a monotonic and continuous weak order and so is representable by a continuous utility function. Assume utility is 0 if consumption of any good is zero.
  - a) Define Walrasian demands and the indirect utility function for this setting.
  - b) State and prove whatever homogeneity properties hold for these functions.
  - c) State and prove whatever monotonicity properties you can about the indirect utility function.
  - d) Is the indirect utility function necessarily quasiconvex? If so, prove this. If not, explain why not.
  - e) Derive an analog of Roy’s Identity for this problem.
  - f) How might we define an analog of the expenditure function for this problem?
4. Consider a consumer with utility function  $u(x_1, x_2) = x_1 x_2$ . Suppose he begins with  $p_1 = p_2 = 1$  and  $w = 40$ . The price of good 1 changes to 4. Compute the compensating and equivalent variation as well as the consumer surplus effect of this price change.