The Ohio State University
Department of Economics
Econ 501.02–Prof. James Peck
Homework #1 (due Thursday, January 22)

1. Suppose we have the utility function,

$$U = x^3 y^3.$$

(a) Find the function for the marginal rate of substitution.
(b) Show that this utility function satisfies the first 3 axioms of consumer preference.

2. Suppose we have the utility function,

$$U = xy + x + y.$$

(a) Find the function for the marginal rate of substitution.
(b) If prices are $p_x = \$2$ and $p_y = \$4$, and if income is $M = \$18$, find the utility maximizing consumption bundle.

3. Suppose we have the utility function,

$$U = xy.$$

(a) Derive the generalized demand function for x as a function of p_x, p_y, and M.
(b) Are the own-price ordinary demand functions downward sloping? Explain.
(c) Is good x normal or inferior? Explain.

4. Suppose there are 100 consumers, each with an income of \$900 and utility function

$$U = x^2 y.$$

Suppose that the price of good y is \$4. Derive the own-price market demand function for x.

Hint: First derive the demand function for one consumer. Since there are 100 identical consumers, the total market demand is 100 times what one consumer would demand.