The Ohio State University
Department of Economics
Econ 501.02–Prof. James Peck
Homework #2 (due Tuesday, February 3)

1. Suppose that the demand for good x is given by the equation

$$x = 10,000 - 10p_x.$$

(a) Derive an equation for the inverse demand function, $p_x(x)$.
(b) Derive formulas for the total revenue and marginal revenue functions (as functions of x).
(c) Find the price and quantity combination that maximizes total revenue.
(d) Calculate the price elasticity of demand for the price-quantity combination you found in part (c).

2. Suppose that the demand for wheat (measured in bushels) is given by

$$w = 160,000,000 - 8000p_w$$

where w is the number of bushels demanded and p_w is the price per bushel.
(a) This year's harvest is 120,000,000 bushels. Calculate the price elasticity of demand at that point.
(b) If next year's harvest were to fall below 120,000,000 bushels, would the revenues received by wheat farmers increase or decrease?

3. Suppose that you own a summer home on a lake in Wisconsin. Say you rent the home out to vacationers on half of the summer weekends, and spend the remaining summer weekends enjoying the home yourself. If the summer rental rate on the lake in Wisconsin increases, explain why you might either increase or reduce the number of weekends you spend in Wisconsin, depending on the strength of the income effect vs. the substitution effect.

4. Suppose country A does not trade with the outside world, and the initial endowment allocation in country A is Pareto optimal. Explain why everyone in country A will benefit by opening up trade with the outside world. (You might want to use an Edgeworth Box to figure out what the competitive equilibrium looks like before country A opens up trade with the outside world.)

5. Consider the following production function

$$x = \frac{100KL}{K+L}.$$

Derive expressions for the marginal rate of technical substitution and the marginal product of labor. You answer will be a function of the inputs, K and L.