

**Econ 325: Environmental and Natural Resource Economics**  
**Fall 2007**  
**Problem Set 1**

Due in class: Tuesday September 18, 2007

Instructions: Answer all 6 questions. Feel free to use Microsoft Excel wherever necessary. Please show your work, and be sure to label all graphs accordingly.

1. Below are the marginal willingness to pay (demand) functions for peanut butter for three individuals: A, B, and C.

Price (\$)	Quantities demanded (pounds)		
	A	B	C
10	4	1	0
9	6	2	0
8	8	3	0
7	10	4	1
6	12	5	2
5	14	7	3
4	17	10	4
3	20	15	5
2	24	25	6
1	30	50	7

- a. Graph the aggregate (market) demand function.

- b. Suppose the marginal cost of producing peanut butter is constant at \$5 per pound. What is the socially efficient rate of peanut butter production?

2. As an environmental economist, you are hired to evaluate whether or not the following project is sensible. The Washington Department of Natural Resources is considering conducting a massive eradication effort for the invasive weed yellow star thistle. The initial cost of the effort will be \$50 million the first year, \$40 in the second and \$25 million in the third. No benefits are expected to accrue until the fourth period. Benefits from removing the weed (increased wildlife grazing, improved land access, increased soil moisture, water conservation, and the preservation of biodiversity) are estimated to be \$3 million dollars a year, although annual maintenance and control costs will be \$0.5 million. These costs and benefits are expected to continue for 50 years following the three years of initial investment.
- A. If the discount rate is equal to 3%, what is the benefit cost ratio of the eradication effort?
  
  
  
  
  
  
  
  
  
  
  - B. If the discount rate is 7%, what is the benefit cost ratio of the eradication effort?
  
  
  
  
  
  
  
  
  
  
  - C. Should we as a society undertake a project simply because the benefit-cost ratio is greater than 1? Or should there be more stringent conditions?

3. Under what circumstances would a hedonic pricing technique be the most appropriate approach to determining the value of a good?

What are the positive and negative aspects of this revealed preference approach?

4. Contingent valuation is one form of direct techniques to solicit value. How does a contingent valuation study attempt to determine willingness to pay for an environmental asset?

What are some of the benefits and drawbacks associated with this method?

5. Assume you have data that suggest that if:
- i. Travel cost is greater than or equal to \$15, no trips are taken.
  - ii. Travel costs are zero, 100 trips are taken.
- a. Draw a travel cost demand curve based on these data.
- b. Calculate ordinary consumer surplus for the individual whose travel costs are equal to \$5.

