Econ 350 > Problem Set 2 > Selected Answers

1. MAC_2 approaches the cost (vertical) axis but never reaches it. Thus, MAC_2 becomes explosively larger as you approach zero emissions. This makes it impossible that optimal emissions could be zero. Optimal emissions could, however, be equal to zero with MAC_1.

2. CO emissions
a) graph would go here
b) The optimal emissions during the winter is E = 100. The optimal emissions during the summer is E = 200. A uniform emissions standard of E = 100 would not be optimal during the summer. By allowing additional emissions during the summer, society could reduce abatement costs more than the increased damages that would result.
c) A seasonal emissions standard would seem to cry out. However, one must also consider the administrative costs of implementing such a seasonal system. If the administrative costs associated with switching back and forth between the two standards is too high, it may not be worth it.

3. Gunk
a) Total Abatement Costs rise by $70. Total Damages fall by $47.5. Therefore, the net change to society is -$22.50.
b) The Total Abatement Cost of achieving 12ppm3 is $101. (The Total Damage is $360, making the Total Social Cost $461.)
c) Graphs not attached.
   i) MD falls and optimal Gunk rises
   ii) MD rises and optimal Gunk falls
   iii) MAC falls and optimal Gunk falls

4. Check the text book.

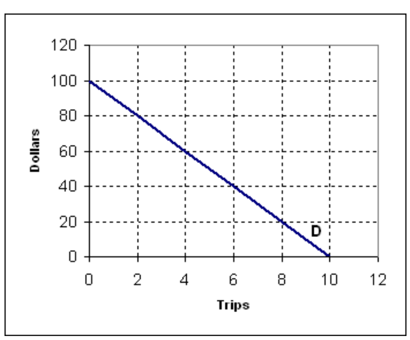
5. To calculate the real value of a variable you would divide its nominal value by a price index.
In 2007 dollars: real abatement costs in 2008 (in terms of 2007 dollars) = [1000/215.3]*207.3 = 962.8. Thus, abatement costs rose from $850 to $962.8 in real (constant 2007 dollars) terms.
In 2008 dollars: real abatement costs in 2007 (in term of 2008 dollars) = [850*215.3]/207.3 = 882.8. Thus, abatement costs rose from $882.8 to $1000 in real (constant 2008 dollars) terms.

6. Check your notes and the book.
7. Check your book on this matter.
8. This is in the text book and there is a clicker question on this one also.

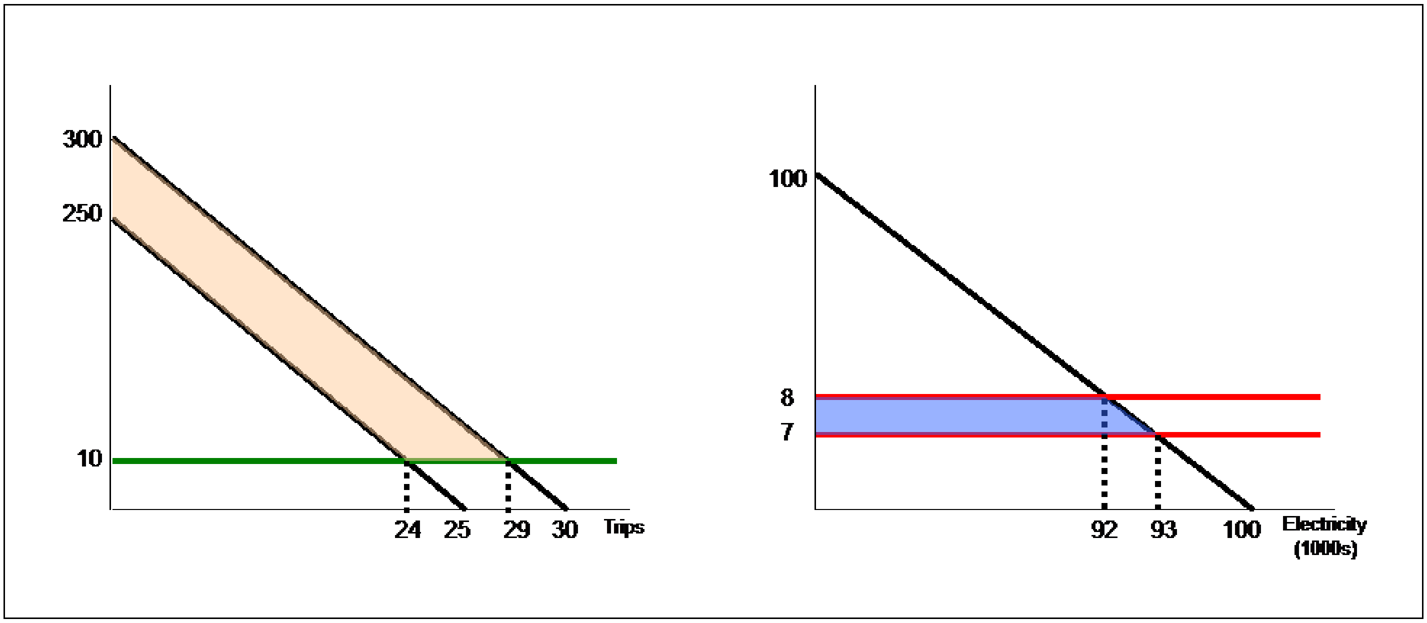
9. Travel Cost
a) The demand curve begins at $15 and slopes downward to the right until it hits the quantity axis at Q = 100.
b) If price is $5, then quantity demanded will be 66.7 trips (ignore the notion that someone could take 7/10ths of a trip). The CS would be $333.5 [= (66.7)($10)(.5)].

10. V = 3000(1/2000) = $6 m

11. a) See graph below.
b) For someone who takes one trip, their WTP must be $90. If the travel cost is $20, then this person's consumer surplus will be $70 (if you want to get technical, you could also add in the little triangle above the $90 price). If the average person takes 4 trips, then their travel cost must be $60. The consumer surplus in this case will be $80. The total expected consumer surplus per year for the park is $4 million.



12. The proposed policy will shift the demand for fishing trips to the right, thereby increasing consumer surplus to fisherman by the tan area shown on the graph to the left below. The proposed policy will also result in higher electricity prices, thereby reducing the consumer surplus of electricity consumers by the blue area shown on the graph to the right below.



The tan area can be calculated as $1,325. This represents the ΔCS for the average fisherman. Since there are 1000 fisherman, the aggregate gain in CS for fisherman is $1,325,000.
The blue area can be calculated as $92,500. This represents the ΔCS (a loss) for the average electricity consumer.
Since the gains to fisherman outweigh the loss to electricity consumers, the policy will increase net social benefits.

13. We did this in class.

14. Use the with/without principle in answering this question.

15. I'll let you contemplate this one. (Hint: Draw a demand curve to illustrate what's going on.)

16. This one is for you to ponder.

17. This is a problem better suited to an Excel spreadsheet. Using the 4% discount rate and looking over the course of 100 years, the PV of the costs will outweigh the PV of the benefits, therefore the project will yield negative net benefits. Using a 2% discount rate will generate a larger PV of net benefits since the benefits are delayed in time relative to costs (benefits bump up to $150 per year, but only after the 50th year).

18. Net benefits are maximized at an emissions level of 4 tons/month (where Net Benefits = $33m). The highest benefit/cost ratio occurs at an emissions level of 6 tons/month (where B/C = 3.56). The B/C ratio ignores the possibility of additional net gains to society of further cleanup.

19. The seven possible alternatives to the status quo have the following costs (millions), benefits (millions), benefit/cost ratios, and net benefits (millions):

Alternative	B	C	B/C Ratio	NB
Project R without road	$10	$8	1.25	$2
Project R with road	18	12	1.50	6
Project F without road	13	10	1.30	3
Project F with road	18	14	1.38	4
Project W without road	5	1	5.00	4
Project W with road	4	5	0.80	-1
Road alone	2	4	0.50	-2

Even though Project W without the road has the largest benefit/cost ratio, Project R with the road offers the largest net benefits among the possible projects and therefore would be selected by the CBA decision rule.

20. The Nuclear Waste Facility Cost-Benefit Study would make for a good exam question.