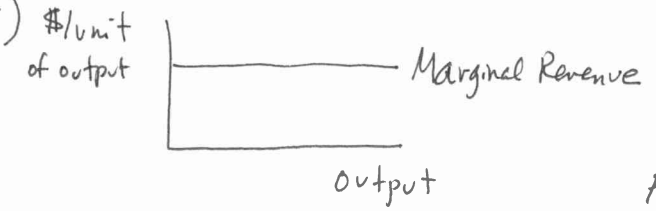
Answers to Exam 1, Econ. 3250, Spring 2011

① a) "Competive" means the firm thinks its actions cannot affect the price it obtains for its output. (Example: a small farmer.)

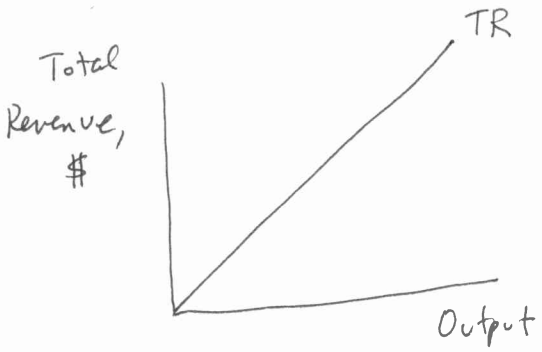
b) In everyday language, "competive" firms would "compete" with rivals in their industry, for example by undercutting a rival's price. There would be strategic interactions between firms. By contrast, firms which are "competive" in the sense of economic theory do not interact strategically, because they see no point in doing so — it won't affect the price of their product anyway. In other words, "competive firms" don't "compete."

c) 

Total Revenue is price (per unit) times quantity: $TR = P \cdot Q$.

For example, if $P = \$4$/unit and $Q = 10$ units, then $TR = \$40$. If Q then increases to 11 units, TR becomes \$44, and Marginal Revenue is $\frac{\text{change in TR}}{\text{change in quantity of output}} = \frac{\$44 - \$40}{11 - 10} =$ \$4, which is the same as price. Price is constant for a competitive firm, as explained in the answer to part (a). Since Marginal Revenue equals price, it is constant too.

Graphically:



Marginal Revenue is the slope of this line, which is a constant.

Using calculus (optional): $TR = P \cdot Q \Rightarrow MR = \frac{dTR}{dQ} =$

$$\frac{dP}{dQ} Q + P \frac{dQ}{dQ} = 0 \cdot Q + P = P.$$

↑ in competition, $dP/dQ = 0$.

(2) The topic was "what is the best way for society to make decisions?"

The Clinton-Bush-Perot example shows a "voting cycle," an illustration that (pairwise) majority voting can be "indecisive" – that is, it can fail to specify what action society should take.* Criteria (a)-(e) are desireable characteristics of a social decision rule, yet they contradict each other (optional: Arrow's Impossibility theorem). So there is no perfect way for societies to make decisions. In environmental economics, cost-benefit analysis is used, but it is not a perfect tool for making social decisions.

*Optional: It shows the "Condoret Paradox" that society prefers Clinton to Bush, and Bush to Perot, but not Clinton to Perot. (The social ranking is not transitive.)

(3) a) The Travel Cost Method is a revealed preference approach because it uses data from actual experiences; it does not use speculative answers to hypothetical questions, as in the expressed preference approach. (The "data" is the cost of traveling to an environmental amenity.)

b) i) The cost should include the opportunity cost of travel time, but this is hard to measure and might be negative if the person enjoys the trip. (The non-pecuniary part of travel time is especially hard to measure.)

ii) If the trip has more than 1 destination, it's hard to apportion the travel costs correctly.

iii) "Substitute sites": visitors to this site who live near many other substitute sites must like this site a lot since they had so many alternative choices. Visitors to this site who live near no other substitute sites might not like this site a lot – they just had nowhere else to go. So these two classes of visitors have different preferences for this site, but they may have the same travel cost, giving rise to the same measured value for this site.

iv) House purchase decision: Someone might value the place so much they move nearby. They would then be local, so have small travel costs, even though they like it a lot.

v) Local visitors: their travel costs are low, but some might like the area a lot.

(4)

Cost-effectiveness analysis calculates the cost to mitigate an environmental hazard to the extent that one life is saved. Environmental hazards are then ranked by this cost. The implication is that the hazards having low "cost to avoid one death" should be ameliorated first.

This can be justified by cost-benefit analysis since the net benefit of ameliorating a hazard would be

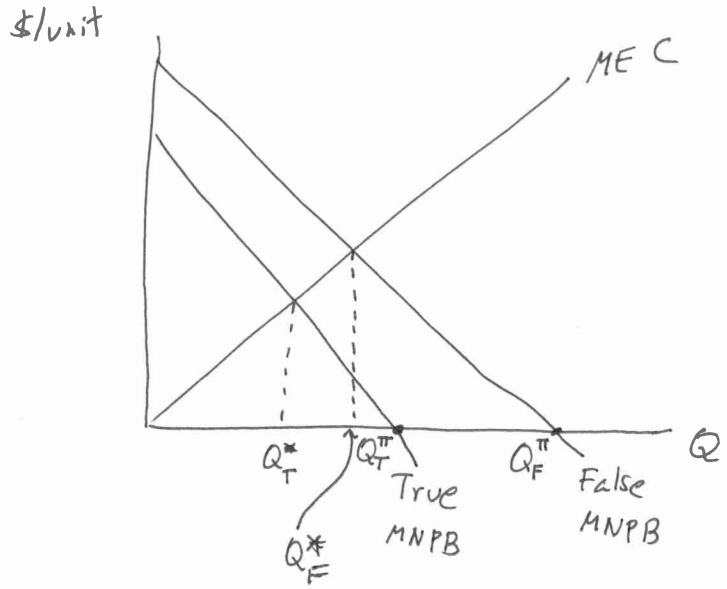
benefit − cost,

↑ benefit: value of one life (same for any hazard)

↑ cost: cost to avoid one death

So the highest net benefit would correspond to the lowest "cost to avoid one death." But if the value of one life were always assumed to be infinite, the net benefit would be $\infty - \text{cost} = \infty$ regardless of the "cost to avoid one death," hence regardless of cost-effectiveness analysis. All actions to alleviate hazards would have an equal value of ∞, so they should all be undertaken and they cannot be ranked.

(5)



Q: output

MNPB: Marginal Net Private Benefit

MEC: Marginal External Cost

In a standard Coasian bargaining process, the pollution victim would pay the polluter to move from Q_T^π (where the polluter maximizes Net Private Benefit) to Q_T^* (the social optimum). The victim is willing and able to pay MEC or less, and the polluter will accept True MNPB or more, so both parties would benefit as Q falls from Q_T^π to Q_T^*.

If the polluter fools the victim into believing "False MNPB," the polluter will be paid by the victim to reduce Q from Q_F^π to a lower Q, for example to Q_T^π or to Q_F^*. If they end at Q_T^π, the polluter is being paid to go where he wants to be anyway. Wherever they end up, it won't be at Q_T^*, so it won't be optimal for society. The firm might get a large payment for reducing Q very little from Q_T^π. Surely the firm benefits from a $Q > Q_T^*$.

(6)

An emissions charge is proportional to the amount of emissions. It's like a pollution tax.

A user charge is not proportional to emissions. Typically, it's due if emissions are greater than zero, but it's the same for all firms who emit. It resembles a license to pollute.

(for all firms = in total)

Both are paid by the firm.

[Don't confuse a user charge with a product charge; the latter is paid by the consumer.]