**1.011 Project Evaluation** • Quiz 3 Debriefing • Lexcie Lu • *MIT Center for Transportation Studies*

Three Golden Rule of Examinations

**(1)** RTQ = Read The Question. If the question asks for an essay "addressing **ONE** of the following topics" means you do not write three essays, but **choose** one of the three topics to address.

**(2)** WSA = Write Something, Anything. If you don't know the answer, draw pacman figures. Maybe the grader will think that the pacman figures represent white cells chasing bacteria (in a biology exam) and give you partial credit. I gave partial credit to anyone who tried to divide anything by anything else that seemed remotely reasonable in Q.3, even if all that the person did was write one or two numbers somewheres on the page that looked remotely like an answer.

**(3)** SAT = Stop And Think. Does it makes sense that in Q.1, the NPV method and the IRR method gives different answers? Does it make sense if the project with the highest IRR has a negative NPV? HELLO?

Outline Solutions

**Q.1** NPV = PV(Benefits) - PV(Costs); IRR = (Annual Income) / Investment
Those with ROI greater than MARR are justified
The best project is the one with the highest NPV -- or use incremental IRR method

**Q.2** Annual Depreciation = (New Value - Scrap Value) / Asset Life; Savings = Depreciation * EffTax%
EffTax% = State% + [Federal%* (1-State%)] -- Because State Tax Expense is Federal Tax Deductable

**Q.3**
Cost Effectiveness (C.E.) = cost per accident avoided = incremental Cost / (Change in # of Accidents)
Decision Rule: If C.E. is smaller than the Expected Cost of Accident then the scheme should go ahead

**Q.4 Part A**

- EIA is predominantly a qualitative approach, a checklist
- Sustainability Assessment asks if resources are being "depleted"
- Cost-Benefit (CBA) is the real way to do it, if you can value the invaluable
- Methods complement each other, and CBA could use EIA and SA data as "inputs"
- Those of whom read the optional readings had the best answers

**Q.4 Part B**

- Marginal Value of Farmland is very low (grain overproduction)
- Suburbia is inefficient in terms of infrastructure provision
- There is a value in having nice backyards etc.
- True solution is to charge for all externalities
- Transit oriented developments might be good, streetcar suburbs with open space in between

**Q.4 Part C**

- Water is a resource, and should be priced accordingly
- Engineering projects need to consider all costs and benefits, including environmental
- Desalinization plants are an option, but expensive, e.g. Florida
- Retreatment plants are good also, e.g. Orange County
- If demand not controlled, people might indeed fight over water