## Possible Solutions for Homework 2

## **Economics of Sustainability**

## K Foster, Colin Powell School CCNY, Spring 2015

- 1. What are the names of people in your study group?
- 2. Consider some discount rate calculations.
  - a. If the interest rate is 5%, what is the discounted value of \$10,000 in 3 years? (You can pick your annualizing frequency)

	r	t	future value	PV at annual interest	PV semi- annual	PV continuous
a	0.05	3	10000	8,638.38	8,622.97	8,607.08
b	0.01	3	10000	9,705.90	9,705.18	9,704.46
с	0.1	3	10000	7,513.15	7,462.15	7,408.18

## See spreadsheet for details.

- b. If the interest rate is 1%, what is the discounted value of \$10,000 in 3 years? (same frequency as before)
- c. If the interest rate is 10%, what is the discounted value of \$10,000 in 3 years? (same frequency)
- d. At a discount rate of 7%, what is the present value of 3 payments made in 10, 12, and 15 years in the future? Calculate at annual compounding, semi-annual compounding, and continuous compounding.

4,965.85	5,025.66	5,083.49		10000	10	0.07	d
4,317.11	4,379.57	4,440.12		10000	12	0.07	
3,499.38	3,562.78	3,624.46		10000	15	0.07	
12,782.34	12,968.01	13,148.07	sum:				

e. (extra) Consider a case where we use (something like) hyperbolic discounting. So to value \$10m in 100 years, we use a discount rate of 0.5% from years 50-100, a discount rate of 1% for years 25-49, and a discount rate of 2% for years up to 25. What is the discounted value? What would be the discounted value at a flat rate of 1%? (Choose a frequency of annualizing)
In 50 years, the value of \$10m in 50 more years would be discounted at .05. Then discount that sum back another 25 years at 1%. Discount it back a further

25 years to the present. Details in spreadsheet.

3. Suppose a possible gas well site, currently untapped, could produce gas sufficient to turn a profit of \$1m in 7 years. How much is the site worth now, if the discount rate were 9%? If the discount rate were 14% because of a greater riskiness? If there is a 50% chance that the rate is 9%, and a 50% chance that the rate is 14%, what is the well worth? What interest rate would give the same value (is it an average of 9% and 14%)? See Excel sheet.