IEMS 326, Homework 6, Due 3/9/2011

*The answers to 1, 3, and 6 appear on p. 485 of the Luenberger section of the book, so you can check your solutions. You must show all your work (which need not be very lengthy). A solution consisting of nothing more than what appears on p. 485 will receive no credit.*

1) Luenberger, Exercise 6.1 (p. 170).

2) We ended Wednesday's lecture talking about house flipping. You buy an ugly condo for 100k and spend 10k renovating it. Now instead of being able to sell it (aka flip it) in two months for 121k (130k minus 9k in fees), suppose that it takes you 6 months to sell and you only obtain 100k (109k minus 9k in fees). Assume you put 20k down, obtained a 30-year mortgage for 90k at 5% APR (i.e., compounded monthly). What is your return on investment (annualized)? What would it be if you paid cash instead of taking a mortgage?

3) Luenberger, Exercise 6.5 (pp. 170-171).

4) This is a portfolio allocation problem. Download the historical prices from 1/1/2004 to 12/31/2008 for the Vanguard Total Stock Market ETF (a proxy for the US stock market) and the Vanguard Total Bond Market Index Fund (a proxy for the US bond market). I suggest going to Yahoo finance, entering the abbreviations for these funds (VTI and VBMFX, respectively), and clicking on historical prices. *Do not turn in a spreadsheet.*

a) Calculate the annual returns. To get an annual return compare the value in the "Adj Close" column (the last column) to the value a year earlier. The Adj column is the right column to use as it assumes dividends get reinvested. What are the average, standard deviations, and correlations of the annual returns?

b) Similar to the Ice Cream and Umbrella spreadsheet, plot the possible allocations on an expected return, standard deviation graph.

5) The spreadsheet with this homework shows mean returns and correlations for stock indices from seven countries (the data is from 1980-1993). The spreadsheet already has calculated the covariance matrix for you and the mean and variance of a portfolio giving equal weight to each stock index. *Do not turn in a spreadsheet.*
a) Use the Excel solver to determine the portfolio with the smallest variance. Do this both for the case when you allow the portfolio weights to be negative (i.e., allowing short-sales) and for the case where you restrict them to be nonnegative.
b) Choose a set of expected returns and then for each find the portfolio with minimum variance that achieves this expected return. Plot this on a mean-standard deviation graph (as we did with the Ice Cream and Umbrella spreadsheet). You should have some sort of parabola. Do this both for the case when you allow the portfolio weights to be negative (i.e., allowing short-sales) and for the case where you restrict them to be nonnegative. Plot both cases on the same graph.

6) Luenberger, Exercise 7.1 (p. 193).

7) Calculate the WACC for GM assuming a $r_f=3\%$ and a 5% market risk premium.