Final A for 9:45 Class: Summer 2013   Name _____

Notes: 1) "Annuity" and "perpetuity" may have growing or constant cash flows. 2) While you are welcome to solve any problem to a final answer, you will only earn points for setting them up. "Setting up" means writing down the appropriate equations and plugging in the appropriate numbers. For multistep problems, you can plug unsolved variables into later steps. Note however, that some problems will require some calculations for you to figure out how to solve them.

Short Answer (15 points each)

1. You have just realized that the number you got when you calculated the present value of an annuity calculation was too low. Excluding math errors, what mistakes might you have made (be as specific as possible)? Note: Use words not symbols.

2. You have just realized that the number you got when you calculated a firm's free cash flow was too low. Excluding math errors, what mistakes might you have made (be as specific as possible)? Note: Use words not symbols.

3. You have just realized that the number you got when you calculated a stock's beta was too high. Excluding math errors, what mistakes might you have made (be as specific as possible)? Note: Use words not symbols.

4. You have just realized that the number you got when you calculated the payoff on a long call was too high. Excluding math errors, what mistakes might you have made (be as specific as possible)? Note: Use words not symbols.

5. You have just realized that the number you got when you used the Black-Scholes option pricing model to value a put was too low. Excluding math errors, what mistakes might you have made (be as specific as possible)? Note: Use words not symbols.

Problems (75 points each)

Use the following information in answering problems 1 and 2.

Android Inc. is considering building another manufacturing facility to meet excess demand for its product. This facility will have the same risk as Android's existing assets. The facility will require an investment of $12 million today and $15 million one year from today. It will be built on land purchased three years ago for $3 million that could be sold today for $2 million. If built, the facility will produce its first net, after-tax cash flow of $1.5 million two years from today. After these initial cash flows, the facility's cash flow will grow by 1% per year through 20 years from today. Android's marginal tax rate is 35%. Android is funded both equity and debt. Android's bonds have a market value of $100 million and a book value of $95 million. Android's equity has a market value of $900 million and a book value of $200 million. Android's bonds are risk-free and earn a 2.5% return, but its stock is risky. To assess the risk of Android's stock, you have collected the following information:

Year	Return on: Android	S&P500
2012	+30%	+14%
2011	– 3%	+2%
2010	+13%	+19%
2009	+57%	+30%

1. Assuming that the market risk premium is 6%, set up the calculations needed to determine Android's weighted average cost of capital.

2. Set up the calculations needed to determine the net present value of the new facility.

3. Use the following information to set up the calculations needed to determine the beta of a call and a put on NoMichiganBondIssues (NMBI) stock.

Information on NMBI assets: expected free cash flow = $350 million per month for the next 12 months, beta = 0.7, cost of capital = 12.5%, standard deviation of returns = 35%, market value = $300 billion

Information on NMBI bonds: annual coupon = $35 million, maturity value = $3 billion, maturity = 15 years, beta = 0.2, required return = 3%, standard deviation of returns = 8%, market value = $4 billion

Information on NMBI stock: expected dividends per share = $0.07 in 2 months, $0.09 in 5 months, $0.10 in 8 months, and $0.11 in 11 months, beta = 1.6, required return = 12%, standard deviation of returns = 43%, market price per share = $36

Information on call on NMBI stock: expiration = 7 months, strike price = $35, standard deviation of returns = 162%, market price = $3.55

Information on put on NMBI stock: expiration = 7 months, strike price = $35, standard deviation of returns = 193%, market price = $2.50

Effective annual rates of return on U.S. Treasuries by maturity (all < 1%): 1 – month = 0.041%, 2 – month = 0.035%, 3 – month = 0.046%, 4 – month = 0.041%, 5 – month = 0.051%, 6 – month = 0.066%, 7 – month = 0.076%, 8 – month = 0.066%, 9 – month = 0.086%

4. Assume that Berkshire and Hathaway have identical assets but that Berkshire is funded with debt that matures five years from today for $20 million while Hathaway is funded only with equity. The market value of Berkshire's bonds is $10 million and of its stock is $25 million. The market value of Hathaway's stock is $30 million. What transactions will generate an arbitrage profit today? Calculate your arbitrage profit. Demonstrate that the conditions of arbitrage are met if the value of Berkshire's and Hathaway's assets end up equaling $15 million five years from today and if their assets end up equaling $30 million five years from today.

5. J.C. Nickel has just announced that it plans to issue bonds and use the proceeds to repurchase shares of stock. At the announcement, J.C. Nickel's stock price per share and the market price of its bonds rose. Excluding tax issues, how would you explain this reaction?