

# [Derivatives – final exam solutions assignment](https://assignbuster.com/derivatives-final-exam-solutions-assignment/)

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Suppose Russ 0 9%, re 0 8%, and u 0 1% per annum (with continuous compounding). Explain in detail which loan plan the corporate client should choose. 4. (20 points) A non-dividend-paying stock with a volatility of 30% per annum is currently trading at $60. Let r 04% . A) Using the I-step binomial tree model, calculate the value of a 6-month European put option with X 0 $75 b) Using the 2-step binomial tree model, calculate the value of a 6-month American put option with X 0 $75 . 5. (20 points) Suppose S (current stock index) 0 1600, r 0 10%, 0 0 20%, and q 4% . An investor has a portfolio which is worth $10, 000, 000 with 0 0 2 .

Suppose the investor wants to protect the value of his/her portfolio at the current level (I. E. 1600). A) Suppose the investor decides to use 3-months S&P 500 futures to achieve the goal. I) How many contracts are needed? It) What is the value of the “ aggregate position” if the index goes down to 1200 3 months later? Suppose the investor decides to use 3- months S&P 500 Put options with X 0 1600 to achieve the goal? Put premium 0 51. 72 I) it) No need to compute !! How many options are needed? What is the value of the “ aggregate position” if the index goes down to 1200 3 months later? ) Suppose the investor decides to sell short 3-months S&P 500 Call options with X 0 1600 to protect its portfolio. Call premium 0 75. 30 I) Suppose he/she shorts the number of options you get in b) I), what is the value of the “ aggregate position” if the 6. (20 points) Today is March 24, 2011. Consider a 4-month futures contract on a deadpanning stock with a spot price of $50. Assume that dividend of $3 per share is expected in 2 months. Let the risk-free interest rate be 7% per annum and the term structure is flat (I. E. The interest rate is constant for any maturity). Calculate the “ correct” price of the futures contract today. B) Suppose you believe the company will increase the dividend to $5 (instead of $3), is the “ market” forward price too high or too low? C) What position should you take in order to take advantage of this MIS- pricing? (I. E. What will you long and what will you short? ) Suppose you establish the position you described in c). One month later, on April 24, 2011, the company reaffirms that the dividend will be $3. D) If S 0 $50 , how much will you make or lose? E) If S 0 $40 , how much will you make or lose?

One month later, on April 24, 2011, the many announces that it will cut its dividend to $1 . F) If S 0 $50 , how much will you make or lose? G) If S 0 $40 , how much will you make or lose? 2 7. (20 points) Today is Feb. 17, 2011. Consider a 3-month forward contract on British Pound with a spot price of $1. 6 / E . Let the risk-free interest rate be 7% and 5% per annum for the USED and British Pound respectively for all maturity. A) Calculate the “ correct” price of the forward contract today. Consider a 3-month forward contract for 1 million E (signed today using the correct forward price). B) One month later, on

March 17, 2011, suppose the spot price of the British Pound increases to $1. 81 E , what will be the value of this forward contract (for 1 million E ) on this day? (Assume the interest rates remain the same. ) c) Suppose on March 17, 2011, this forward contract (for 1 million E ) is quoted at $20, 000. What should you do in order to make money? Suppose you establish the position in c), calculate the profit of your position when the forward contract expire. [Note that you are not provided the spot price on the expiration day. ] d) 8. (20 points) Consider a non-dividend paying stock. Assume S 0 $100, r 0 10%, 0 30% .