Exercises on options and combinations

Exercise 1

Define the following terms: call option; put option; exercise price or strike price; option price; expiration date; payoff and profit of a call/put option, in-the-money call; out-of-the-money call.

Given the following information about a box spread related to 1000 shares of Company XYZ stock:

1. The current price of Company XYZ's stock is \$100.
2. The strike prices of the European call options underlying the box spread are \$110 and \$120.
3. The time to maturity of the box spread is 1 year.
4. The continuously compounded risk-free rate is 5% per annum.

   (a) Investor A is willing to purchase the box spread from you for \$9750.

   (b) Investor B is willing to sell the box spread to you for \$9750.

Assume there are no taxes or transaction costs and you can borrow or lend at the risk-free rate.

Question 1. Explain whether you purchase or sell the box spread. Calculate the profit you earn. Show all work.

Question 2; You own a put option on Oracle Corporation stock with an exercise price of \$20 that expires today. Plot the value of this option as a function of the stock price.

Do the same for the short position.

Exercise 2

Give the payoof of the following combined options and plot the combined payoff

1. long the asset coupled with a written call.
2. short the asset coupled with a purchased call
3. long the asset coupled with a purchased put.
4. being short the asset coupled with a written put.

Exercise 3

AMZN **77.03 +1.40**

Jul 08 2009 @ 15:26 ET **Bid** 77.02 **Ask** 77.03 **Size** 1 x 3 **Vol** 6548487

Calls	Last Sale	Net	Bid	Ask	Vol	Open Int	Puts	Last Sale	Net	Bid	Ask	Vol	Open Int
09 Jul 70.00 (ZQN GN-E)	7.65	1.60	7.20	7.30	221	2637	09 Jul 70.00 (ZQN SN-E)	0.36	–0.18	0.36	0.38	684	11031
09 Jul 75.00 (ZQN GO-E)	3.35	0.86	3.20	3.30	943	6883	09 Jul 75.00 (ZQN SO-E)	1.30	–0.66	1.38	1.40	2394	15545
09 Jul 80.00 (QZN GP-E)	0.94	0.24	0.93	0.96	2456	9877	09 Jul 80.00 (QZN SP-E)	4.15	–1.05	4.00	4.10	700	10718
09 Jul 85.00 (QZN GQ-E)	0.22	0.07	0.19	0.21	497	26679	09 Jul 85.00 (QZN SQ-E)	8.25	–1.25	8.25	8.35	112	7215
09 Aug 70.00 (ZQN HN-E)	9.75	1.04	9.60	9.70	51	326	09 Aug 70.00 (ZQN TN-E)	2.77	–0.39	2.75	2.79	225	1979
09 Aug 75.00 (ZQN HO-E)	6.50	0.70	6.40	6.50	65	1108	09 Aug 75.00 (ZQN TO-E)	4.60	–0.55	4.55	4.60	2322	6832
09 Aug 80.00 (QZN HP-E)	4.00	0.50	3.90	4.00	172	2462	09 Aug 80.00 (QZN TP-E)	6.95	–0.95	7.05	7.15	145	2335
09 Aug 85.00 (QZN HQ-E)	2.15	0.15	2.22	2.26	833	5399	09 Aug 85.00 (QZN TQ-E)	10.15	–1.00	10.30	10.40	43	4599

1. Plot profits of call options quoted in the above table with respect to the price of the asset in one graph
2. Plot profits of put options quoted in the above table with respect to the price of the asset in one graph
3. Gives your remarks

Exercise 4

1. Explain the difference between a long position in a put and a short position in a call.
2. Which of the following positions benefit if the stock price increases?
   (a) Long position in a call
   (b) Short position in a call
   (c) Long position in a put
   (d) Short position in a put
3. You own a call option on Intuit stock with a strike price of $40. The option will expire in exactly three months' time.
   (a) If the stock is trading at $55 in three months, what will be the payoff of the call?
   (b) If the stock is trading at $35 in three months, what will be the payoff of the call?
   (c) Draw a payoff diagram showing the value of the call at expiration as a function of the stock price at expiration.
4. You own a put option on Ford stock with a strike price of $10. The option will expire in exactly six months' time.
   (a) If the stock is trading at $8 in six months, what will be the payoff of the put?

(b) If the stock is trading at $23 in six months, what will be the payoff of the put?

(c) Draw a payoff diagram showing the value of the put at expiration as a function of the stock price at expiration.

5. What position has more downside exposure: a short position in a call or a short position in a put? That is, in the worst case, in which of these two positions would your losses be greater?

6. You are long both a call and a put on the same share of stock with the same exercise date. The exercise price of the call is $40 and the exercise price of the put is $45. Plot the value of this combination as a function of the stock price on the exercise date.

7. You are long two calls on the same share of stock with the same exercise date. The exercise price of the first call is $40 and the exercise price of the second call is $60. In addition, you are short two otherwise identical calls, both with an exercise price of $50.
   Plot the value of this combination as a function of the stock price on the exercise date. What is the name of this combination of options?

8. A forward contract is a contract to purchase an asset at a fixed price on a particular date in the future. Both parties are obligated to fulfill the contract. Explain how to construct a forward contract on a share of stock from a position in options.

9. You own a share of Costco stock. You are worried that its price will fall and would like to insure yourself against this possibility. How can you purchase insurance against this possibility?