**Introduction to Mathematical Finance**

**Problem Sheet 5**

Date Due:

1. Two parties agree to a forward contract to exchange 100 shares of a stock one year from now for $72 per share. Immediately after they initiate the contract, the price of the underlying stock increases to $74 per share. This share price increase represents a gain for:  
A. the buyer.  
B. the seller.  
C. neither the buyer nor the seller.

2. For a forward contract on an asset that has no costs or benefits from holding it to have zero value at initiation, the arbitrage-free forward price must equal:  
A. the expected future spot price.  
B. the future value of the current spot price.  
C. the present value of the expected future spot price.

3. Which of the following is most similar to the floating-rate receiver position in a fixed-for-floating interest-rate swap?  
A. Buying a fixed-rate bond and a floating-rate note.  
B. Buying a floating-rate note and issuing a fixed-rate bond.  
C. Issuing a floating-rate note and buying a fixed-rate bond.

4. The lower bound for the value of a European put option is:  
A. Max(0, S – X)  
B. Max[0, X(1 + Rf)–(T–t) – S]  
C. Max[0, S – X(1 + Rf)–(T–t)]

5. The put–call-forward parity relationship least likely includes:  
A. a risk-free bond.  
B. call and put options.  
C. the underlying asset.

6. The put–call parity relationship for European options must hold because a protective put will have the same payoff as:  
A. a covered call.  
B. a fiduciary call.  
C. an uncovered call

A. Given S0 =$45 the price of the underlying stock at t=0, the risk-free rate Rf is 5%. Use the no-arbitrage forward pricing method to calculate the the strike price F0 of a forward contract at t=0.

B. The risk-free rate is 5%. You have found a quote for a 3-month put option with an exercise price of $50 and the put price is $11.50, and the price of the 3-month call option is $2.10. Estimate the contract price for a forward contract.