**Question 1**

**A four month European call option on a dividend-paying stock is currently selling for $5. The stock price is $64, the strike price is $60 and a dividend of $0.80 is expected in one month. The risk free interest rate is 12% per annum for all maturities. What opportunities are there for an arbitrageur?**

Xe^rt= 60e^-0.3333\*0.12 = 57.65.

D= 0.80\*e^0.0833\*0.12=0.79

5<64-57.65-0.79, creating arbitrage opportunities.

An arbitrageur should buy the option and short the stock. Regardless of what happens a profit will materialize. If the stock price declines below $60, the arbitrageur loses the $5 spent on the option but gains at least 64-57.65-0.79=5.56 in present value terms from the short position. If the stock price is above $60 at the expiration of the option, the arbitrageur gains in the present value terms exactly 5.56-5=0.56.

**Question 2**

**The price of an American call on a non dividend paying stock is $4. The stock price is $31, the strike price is $30 and the expiration date is in three months. The risk free interest rate is 8%. Derive upper and lower bounds for the price of an American put on the same strike price and expiration date.**

S0 - X < C - P < S0 - Xe^-rt

In this case, 31 – 30 < 4 – P < 31 - 30e^-0.08\*0.25 🡺 1 < 4 – P < 1.59

**Question 3**

**What is the lower bound for the price of a two month European put option on a non dividend paying stock when the stock price is $58, the strike price is $65 and the risk free interest rate is 5% per annum?**

The lower bound is 65e^-0.1667\*0.05-58=6.46

**Question 4**

**What is the lower bound for the price of a six month call option on a non dividend paying stock when the stock price is $80, the strike price is $75 and the risk free interest rate is 10% per annum?**

The lower bound is 80-75e^-0.1\*0.5 = 8.66