Chapter 10

Properties of Stock Options

Practice Questions

Problem 10.9

What is a 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?

Problem 10.10

What is a 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?

Problem 10.11

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?

Problem 10.12

A one-month European put option on a non-dividend-paying stock is currently selling for $2.50. The stock price is $47, the strike price is $50 and the risk-free interest rate is 6% per annum. What opportunities are there for an arbitrageur?

Problem 10.13

Give an intuitive explanation of why the early exercise of an American put becomes more attractive as the risk-free rate increases and volatility decreases.

Problem 10.14

The price of a European call that expires in six months and has a strike price of $30 is $2. The underlying stock price is $29 and a dividend of $0.50 is expected in two months and again in five months. The term structure is flat, with all risk-free interest rates being 10%. What is the price of a European put option that expires in

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six months and has a strike price of $30?

Problem 10.15

Explain carefully the arbitrage opportunities in question 10.14 if the European put price is $3.

Problem 10.16

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 stock with the same strike price and expiration date.

Problem 10.22

A European call option and put option on a stock both have a strike price of $20 and an expiration date in three months. Both sell for $3. The risk-free interest rate is 10% per annum, the current stock price is $19 and a $1 dividend is expected in one month. Identify the arbitrage opportunity open to a trader.