

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

AS498 - Section 01 (Term 161)

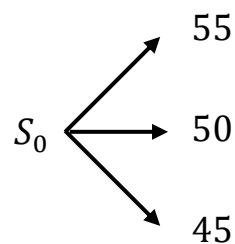
Date: October 25, 2016

Quiz 2

Duration: 30 minutes

Family Name: _____ ID #: _____ Serial #: _____

1. Consider the following trinomial model for stock S.



You are given:

- (i) The time period of the tree is 1 year.
- (ii) The stock pays no dividends.
- (iii) The continuously compound risk free interest is 3%.
- (iv) A 1-year 50-strike put option on the stock has a price of 0.5.
- (v) A 1-year 52-strike call option on the stock has a price of 0.6.

Find the following:

- (a) Find the risk neutral probability for associated with the middle node.

- (b) Find the value of S_0 .

- (c) Find the price of a 1-year 53-strike call option on the stock.

(3 + 3 + 3 = 9 points)

2. Let $X(t)$ be an arithmetic Brownian motion with drift parameter $\mu = 0.10$ and variance parameter $\sigma^2 = 0.09$. In other words:

$$X(t) = 0.10t + 0.30Z(t)$$

where $Z(t)$ is a standard Brownian motion. Find the following:

(a) $\mathbb{P}(0.80 < X(5) < 1.20)$

(b) $\mathbb{P}(0.80 < X(5) < 1.20 | X(3) = 0.60)$

(c) $E[X(10)] + V[X(10)]$

(d) $\text{Cov}[Z(3), Z(7)]$

(3 + 4 + 2 + 2 = 11 points)