

Math 194, Winter 2008

Homework 3 — Due Wednesday, January 23

1. Consider a single-period binomial model with $r = 1/5$, $S_0 = 3$, $u = 2$, $d = 1/2$, and $p = 3/4$. Let X be a European *put* option with strike price $K = \$5$, expiring at time $T = 1$. Compute the arbitrage free price of this option.

2. Consider a three period ($T = 3$) binomial model with initial stock price $S_0 = \$100$, $u = 3$, $d = 1/2$, $r = 1/10$, $p = 1/3$.
 - (a) Draw the binary tree illustrating the possible paths followed by the stock price process.
 - (b) In your diagram, record the probabilities associated with the individual element of the sample space Ω .
 - (c) List the events making up the σ -field \mathcal{F}_1 determined by S_1 . (Be sure to include the empty set and the whole sample space.)
 - (d) Indicate on your binary tree the values (one for each path) of a European contingent claim whose payoff at $T = 3$ is $X = \max(S_0, S_1, S_2, S_3)$.

3. Exercise 2, Section 2.4 (page 28 of the text).