

Math 194, Winter 2008

Homework 2 — Due Wednesday, January 16

1. Consider a single-period binomial model with $r = 1/3$, $S_0 = 2$, $d = 5/4$, $u = 3/2$, and $p = 3/5$.
 - (a) Compute B_1 .
 - (b) Compute $S_1(\omega_1)$ and $S_1(\omega_2)$, and the probability of each outcome.
 - (c) For the trading strategy $\phi = (2, 5)$, compute $V_0(\phi)$, $V_1(\phi)(\omega_1)$, and $V_1(\phi)(\omega_2)$.
 - (d) Let X be a European call option with strike price \$2.75 and expiration time $T = 1$.
 - (i) Find $X(\omega_1)$ and $X(\omega_2)$.
 - (ii) Find the replicating strategy for X
 - (iii) Find the manufacturing cost for that strategy.
 - (e) Give an example of arbitrage opportunity if the claim X can be purchased for $C_0 = 1/32$ (dollars) at time 0.

2. Repeat the steps of exercise 1, with the following data: $r = 1/4$, $S_0 = 3$, $d = 1$, $u = 2$, and $p = 3/4$. Use the trading strategy $\phi = (3, 2)$. The contingent claim X is now a European *put* option with strike price $K = \$5$. Use $C_0 = 1$ in doing part (e)

3. Exercise 1 in section 2.4 of the text (page 28).