The University of Texas at Austin
In-Class Work 12

M339D Introduction to Financial Mathematics

October 16, 2026

Replicating Portfolios.

Problem 12.1. Let the be equal to 0.04. Consider a one-period binomial tree with every period of length one year used to model the stock price of a stock whose current price is \$80 per share. In the model, it is assumed that the stock price can either go up by \$5 or down by \$4.

You use the binomial tree to construct a replicating portfolio for a 78 —strike call option on the above stock. What is the stock investment in the replicating portfolio?

Problem 12.2. Let the be equal to 0.04. Consider a one-period binomial tree with every period of length one year used to model the stock price of a non-dividend-paying stock whose current price is $\$50$ per share. In the model, it is assumed that the stock price can either go up by 5% or down by 10%.

You use the binomial tree to construct a replicating portfolio for a 45 —strike call on the above stock. What is the risk-free investment in the replicating portfolio?

Problem 12.3. Consider a non-dividend paying stock whose current price is $95 per share. You model the evolution of this stock price over the following year using a one-period binomial tree under the assumption that the stock price can be either $120, or $75 in one year.

The continuously compounded, risk-free rate is 0.06.

A **straddle** consists of a long call and a long otherwise identical put. Consider a $100-strike, one-year European straddle on the above stock. What is the straddle's price consistent with the above stock-price model?

a. About $10
b. About $10.83
c. About $15.45
d. About $20.84
e. None of the above.