Financial Mathematics

Testing
the Black-Scholes formula

0062-1. Suppose that, on a certain stock,
the annual drift is 0.02
and the annual volatility is 0.35.
Suppose that the current share price
of the stock is \$1.
Assume that \$1 invested risk-free for one year
grows to $e^{0.015}$ dollars.

a. Using the B-S Option Pricing Formula,
price a 0.25-year call option on the stock
with a strike price of \$1.

b. Calibrate the uptick and downtick factors,
e^u and e^d, of a 50-50 CRR model
in which each subperiod is 1/12 of a year.

c. Using a 3-subperiod 50-50 CRR model,
price a 0.25-year call option on the stock
with a strike price of \$1.