UNIVERSITY OF TEXAS AT AUSTIN

Log-normal stock prices: Tail probabilities.

Problem 6.1. You are considering an investment in a non-dividend-paying stock versus an investment in a savings account. According to your belief, the stock's mean rate of return is α and its volatility is σ.
  The continuously compounded interest rate is equal to r.
  What is the probability that the stock outperforms the savings account at time$-T$? You should leave your final answer in terms of the function N.

Problem 6.2. Assume the Black-Scholes framework. You are given the following information for a stock that pays dividends continuously at a rate proportional to its price:
  (i) The current stock price is \$250.
  (ii) The stock's volatility is 0.3.
  (iii) The continuously compounded expected rate of stock-price appreciation is 15%.
Find the value s^* such that
$$\mathbb{P}[S(4) > s^*] = 0.05.$$

  (a) \$861.65
  (b) \$874.18
  (c) \$889.94
  (d) \$905.48
  (e) None of the above.