

## UNIVERSITY OF TEXAS AT AUSTIN

Quiz #4

Log-normal stock prices: Tail probabilities.

**Problem 4.1.** (5 points)

The current stock price is given to be  $S(0) = 30$ . The stock has the rate of appreciation 0.12 and volatility 0.3

Let  $a$  denote the probability that the stock price in three months is less than \$32, i.e., set  $a = \mathbb{P}[S(1/4) < 32]$ .

Then,

- (a)  $0 \leq a < 0.35$
- (b)  $0.35 \leq a < 0.45$
- (c)  $0.45 \leq a < 0.50$
- (d)  $0.50 \leq a < 0.64$
- (e) None of the above.

**Problem 4.2.** (10 points)

Let  $\mathbf{S} = \{S(t), t \geq 0\}$  denote the stock-price process. For any time  $t$ , the stock price is modeled as lognormal. The mean stock price at time  $t=2$  equals 140 and the median stock price at time  $t=2$  equals 130. What is the probability that the time  $t=2$  stock price exceeds 140?