

9. Financial analysts often use the following model to characterize changes in stock prices:

$$P_t = P_0 e^{(\mu - 0.5\sigma^2)t + \sigma Z\sqrt{t}}$$

where

P_0 = current stock price

P_t = price at time t

μ = mean (logarithmic) change of the stock price per unit time

σ = (logarithmic) standard deviation of price change

Z = standard normal random variable

This model assumes that the logarithm of a stock's price is a normally distributed random variable (see the discussion of the lognormal distribution and note that the first term of the exponent is the mean of the lognormal distribution). Using historical data, one can estimate values for μ and σ . Suppose that the average daily change for a stock is \$0.003227, and the standard deviation is 0.026154. Develop a spreadsheet to simulate the price of the stock over the next 30 days, if the current price is \$53. Use the Excel function `NORMSINV(RAND())` to generate values for Z . Construct a chart showing the movement in the stock price.