Exercise 02-02 (exploratory analysis)

1. Download 40 years of S&P 500 index price data (monthly frequency, Jan 3, 1977 through Jan 3, 2017). You can get this by going to finance.yahoo.com and search for S&P 500 (or ^GSPC). Click on historical data, set dates and frequency then download.

2. Read this data into R using, e.g., `read.csv()`. You will want to use the variable "Close." Note that you will need to reverse the order of the data (when downloaded it is most recent first). Make a time series object, setting the start date and frequency appropriately.

3. Plot the data and log data. Which do you like better?

4. Estimate a time trend. Plot the time trend (in red) superimposed on the data.

5. Plot the residuals. Also plot an ACF of the residuals.

6. Compute and plot first differences of the data (these are log returns).

7. Estimate the drift term of a random walk with drift model fitted to the log price data. Plot the residuals of this model. Plot an ACF of the residuals. Does it look like white noise? Also do a normal quantile plot of the residuals. Do they look normal?