***E370, Spring 2016***

***Lab Activities week of 2/29/2016***

# Valued at 25 points

Solve the following questions. Please write the command you use for any calculations as well as the result to obtain full credit.

1. The Standard & Poor's 500 (S&P 500) is an American stock market index based on the market capitalizations of 500 large companies having common stock listed on the NYSE or NASDAQ. Suppose the stock prices of the 500 companies are normal distributed with a mean of $80.7 and standard deviation of $97.6. Answer the following questions.
2. What is the probability that a company randomly selected from the S&P 500 has a stock price of exactly $100? (1 point)
3. What is the probability that a company randomly selected from the S&P 500 has a stock price lower than 70$? (2 points)
4. What is the probability that a company randomly selected from the S&P 500 has a stock price between $30 and $120? (2 points)
5. The current stock price of Apple Inc. is $110.90. What percentage of stocks has a higher price than Apple Inc.? (2 points)
6. How many standard deviations is Apple’s price away from the mean? (2 points)
7. The highest 25% of stock prices will be at least what price? (2 points)
8. Between which two prices symmetric around the mean will 50% of the stock prices fall? (2 points)
9. A research team collected 5 years of monthly rainfall data in the Amazon basin. The monthly rainfall is approximately normally distributed. Use data in the “Rainfall.xlsx” file located in Oncourse under Resources🡺Lab Manual Data or in the folder Lab Manual Data Files in Box at <https://iu.box.com/E370-Files> to answer the following questions.

1. Suppose that the team wants to know the likelihood of observing less than 100 mm of rainfall in a given month, which distribution should be used and why? What is/are its parameter(s)? (2 points)
2. What is the mean and standard deviation of monthly rainfall? (1 point)
3. What is the likelihood of observing less than 100 mm of rainfall in a given month? (2 points)
4. If a particular plant in the rainforest can only survive if the rainfall is at least 60mm but not more than 170 mm in a month, what is the likelihood that it will survive in a given month? (3 points)
5. A type of cactus can stand minimal rainfall but would die if receiving too much water. The research team knows the monthly survival rate of this cactus is 60%. What is the upper limit of water tolerance for the cactus? (2 points)
6. Suppose that another plant will die if it receives less than 100 mm of water and the month to month survival rate of the plant in the Amazon environment is 75%. What is the most water that this plant can survive in a given month? (2 points)