**R Lesson 6 - Continuous Distributions**

**References:**  
Black - Chapter 6 Continuous Distributions (pp. 184-255)  
Verzani Chapter 6 Populations (pp. 227-233)  
Lander Chapter 14 Probability Distributions (pp.171-186)  
Stowell Chapter 7 Probability Distributions (pp. 87-97)

**Exercises:**

Assume the purchases of shoppers in a store have been studied for a period of time and it is determined the daily purchases by individual shoppers are normally distributed with a mean of $81.14 and a standard deviation of $20.71. Find the following probabilities using R.

1. What is the probability that a randomly chosen shopper spend less than $75.00?
2. What proportion of shoppers spend more than $100.00?
3. What proportion of shoppers spend between $50.00 and $100.00?
4. Assume that the shopper’s purchases are normally distributed with a mean of $97.11 and a standard deviation of $39.46. Find the following scores using R.
5. What weight is the 90th Percentile of the shoppers’ purchases? That is, find the score P90 that separates the bottom 90% of shoppers’ purchases from the top 10%.
6. What is the median shoppers’ purchase? (Find the score P50 that separates the bottom 50% of shoppers’ purchases from the top 50%.) What is important about this number?
7. Generate a sample of size 50 from a normal distribution with a mean of 100 and a standard deviation of 4. What is the mean and standard error of the mean for the sample? Generate a second sample of size 50 from the same normal population. What is the mean and standard error of the mean for this second sample? Now repeat this process generating a sample of size 5000. Calculate the mean and standard error of the mean for this third sample and compare to the previous samples. What do you observe?
8. Assume a biased coin when flipped will generate heads one third of the time. Estimate the probability of getting at least 250 heads out of 600 flips using the normal distribution approximation. Compare to the exact probability using the binomial distribution.
9. Use the uniform distribution over 0 to 1. Generate three separate simple random samples of size n = 25, n = 100, n = 400. Plot histograms for each and comment on what you observe.
10. [salaries.csvView in a new window](https://canvas.northwestern.edu/courses/38799/files/2178772/download?wrap=1) gives the CEO age and salary for 60 small business firms. Construct QQ plots and histograms. Is the distribution of ages a normal distribution? Explain your answer.

**Running into Trouble?** Check out these solutions to help guide you along.

* [Lesson\_06\_Solutions.pdfView in a new window](https://canvas.northwestern.edu/courses/38799/files/2178784/download?wrap=1)
* [Lesson\_06\_Code\_Solution.rView in a new window](https://canvas.northwestern.edu/courses/38799/files/2178713/download?wrap=1)