ST511 HW #2

Reading: Browse Chapters 3-5 of Ott & Longnecker.
See Canvas Calendar for due date.

40 points total, 2 points per problem part unless otherwise noted.

1. Assume that Z has a standard normal distribution. Compute the following.
   A. $P(Z \leq 0.64)$
   B. $P(Z \leq -0.37)$
   C. $P(Z > 1.24)$
   D. $P(-0.37 \leq Z \leq 1.15)$
   E. Find the value z such that $P(Z \leq z) = 0.3300$
   F. Find the value z such that $P(Z > z) = 0.1841$

2. Assume that Y has a normal distribution with mean 5.4 and standard deviation 0.2. Compute the following.
   A. $P(Y \leq 5.7)$
   B. $P(Y > 5.3)$
   C. $P(5.2 \leq Y \leq 5.5)$
   D. Find the value y such that $P(Y \leq y) = 0.85$.

3. Let Y have a skewed distribution with $\mu=80$ and $\sigma=5$. Suppose a random sample of size n=100 is drawn from the population.
   A. Give an interval with the property that at least 75% of the data will be in that interval. What rule did you use to determine the interval?
   B. Describe the distribution of $\bar{Y}$. Give the mean, standard deviation and shape of the distribution. (**3 pts**)

4. A random sample of n=25 seeds from a particular bean population is obtained. The weight (g) of each seed is recorded. The data is available from Canvas as "Seeds.csv".
   Reminders: (1) Use read.csv() to import the data. (2) Use str() to check the data after importing. (3) Use $ or with() to access the Weight column!
   A. Construct a histogram of the data. Also give the sample mean and sample standard deviation. (**3 pts**)
   B. Give a 95% confidence interval for μ (population mean seed weight).
   C. Interpret your confidence interval from part B.
   D. Do you think the CI is valid? In other words, discuss whether assumptions satisfied.

5. Describe how the following affect the width of the confidence interval (assuming everything else is held constant). Answer should be increase, decrease or stays the same.
   A. Sample size increases.
   B. Confidence level increases.
   C. Standard deviation increases.