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. $P(Z \leq 0.57)$
   B. $P(Z \leq -0.32)$
   C. $P(Z > 2.10)$
   D. $P(-0.32 \leq Z \leq 1.55)$
   E. Find the value z such that $P(Z \leq z) = 0.3300$
   F. Find the value z such that $P(Z > z) = 0.3987$

2. Assume that Y has a normal distribution with mean 6 and standard deviation 0.8. Compute the following.
   A. $P(Y \leq 7)$
   B. $P(Y > 5.4)$
   C. $P(6 \leq Y \leq 7.2)$
   D. Find the value y such that $P(Y \leq y) = 0.85$.

3. Assume that *T* has Student's *t*-distribution with the given degrees of freedom.
   A. If *T* has 25 degrees of freedom, find the $P(T > 1.708)$.
   B. If *T* has 9 degrees of freedom, find the value *t* such that $P(|T| < t) = 0.95$.
   C. If *T* has 50 degrees of freedom, find the value *t* such that $P(T > t) = 0.90$.

4. Let Y have a <u>skewed</u> distribution with $\mu=90$ and $\sigma=10$. 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**)

5. A random sample of n=25 seeds from a particular bean population is obtained. The weight of each seed is recorded. The data is available from Canvas as "Seeds.csv".
   Reminders: (1) Use read.csv() to read import the data. (2) Use View() and/or str() to check the data after importing. (3) Use $, with() or attach() 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. If you were to do a formal test of H0: $\mu=500$ vs HA: $\mu\neq500$ what would your conclusion be? Explain.