Assignment #6 — Due Friday, October 28 by 4:00 P.M.

Turn in homework to your TA’s mailbox using this sheet as the cover page.

Fill in your name and also circle the lecture section in which you are registered and circle the discussion section you expect to attend to pick up this assignment.

Name:

Lecture 1 (Hanlon). 311: Tu 1:00 - 2:15pm 312: Th 8:00 - 9:15am 313: We 1:00 - 2:15pm

Lecture 2 (Larget). 321: Tu 1:00 - 2:15pm 322: We 2:30 - 3:45pm 323: We 1:00 - 2:15pm

Please answer the following questions.

1. Let $Z \sim N(0, 1)$. Answer the following questions using both the normal table and software (such as R).
   
   (a) Compute $P(Z \leq 0.75)$.
   (b) Compute $P(Z \geq -0.97)$.
   (c) Compute $P(-1.18 \leq Z \leq -1.11)$.
   (d) $P(Z > z) = 0.05$. Find $z$.
   (e) $P(Z < z) = 0.10$. Find $z$.
   (f) $P(-z < Z < z) = 0.7$. Find $z$.

2. Let $t(x)$ denote a $t$ random variable with $x$ degrees of freedom. Answer the following questions using both the t table and software (such as R).
   
   (a) Let $T \sim t(10)$. Compute $P(T \leq 0.75)$.
   (b) Let $T \sim t(13)$. Compute $P(T \geq -0.97)$.
   (c) Let $T \sim t(19)$. Compute $P(-1.18 \leq T \leq -1.11)$.
   (d) Let $T \sim t(11)$. $P(T > z) = 0.05$. Find $z$.
   (e) Let $T \sim t(15)$. $P(T < z) = 0.10$. Find $z$.
   (f) Let $T \sim t(17)$. $P(-z < T < z) = 0.7$. Find $z$.

3. The total nitrogen concentration of the blood plasma of healthy 40 day old albino rats is normally distributed with mean 1.25 g/100ml and standard deviation 0.0080 g/100ml. Let $\bar{X}$ represent the mean nitrogen concentration level of 25 rats randomly chosen from this population.
   
   (a) If a healthy 40 day old albino rat is chosen at random, what is the probability that the total nitrogen concentration of its blood plasma will be between 1.26 g/100ml and 1.30 g/100ml?
   (b) What is the value of nitrogen concentration such that 65% of 40 day old albino rats have a nitrogen concentration higher than that value?
   (c) Compute $P(1.24 \leq \bar{X} \leq 1.26)\) 
   (d) Compute the 0.90 quantile of the sampling distribution of $\bar{X}$.
   (e) Compute the cutoff values for the middle 80% of the sampling distribution of $\bar{X}$.

4. Textbook p.254, Problem 16

5. Textbook p.254, Problem 17

6. Textbook p.255, Problem 20