Name: _____ Section: Mon / Wed

FOR 373: Extra Credit Problems [60 points]

Notes: 2-pages of notes can be attached to this assignment and you are encouraged to use your calculator or Excel where necessary. You must show your work to receive any credit (e.g., the equation you use and any assumptions you make). Doing so also indicates whether you understand the method and help you receive partial credit, even if your final answer is incorrect.

1. What is the only scenario where it is appropriate to use equal allocation?

2. From the following preliminary cruise statistics, determine how many plots you would need in order to estimate the mean volume per acre within the stand to within 9%, at 90% certainty. Assume the Stand is infinitely large.
   Mean = 900 cu ft/ acre plots = 3 1/20th acre standard deviation = 210 cu ft/ acre

3. From the following preliminary cruise statistics, determine how many plots you would need in order to estimate the mean volume per acre within the stand to within 100 cu ft, at 95% certainty. Assume the Stand is 60 acres.
   Mean = 1050 cu ft/ acre plots = 4 1/10th acre standard deviation = 240 cu ft/ acre

4. From the following preliminary cruise statistics, determine how many plots you would need in order to estimate the mean volume per acre within the stand to within 8%, at 90% certainty. Assume the Stand is 75 acres.
   Mean = 15.5 mbf/ acre plots = 3 1/20th acre standard deviation = 3.1 mbf/ acre

5. From the following preliminary cruise statistics, determine how many plots you would need in order to estimate the mean volume per acre to within 115 cu ft, at 90% certainty. Assume the Stand is infinitely large.
   Mean = 1200 cu ft/ acre plots = 5 1/20th acre standard deviation = 335 cu ft/ acre

6. From the following preliminary cruise statistics, determine how many plots you would need in order to estimate the mean volume per acre within the stand to within 12%, at 95% certainty. Assume the Stand is infinitely large.
   Mean = 750 cu ft/ acre plots = 4 1/10th acre standard deviation = 260 cu ft/ acre

7. If you have a stand that you stratify into 3 strata and you know that strata 1 has a variance twice as large as the other 2 strata and that all three strata are 30 acres, how many of your 40 plots would allocate to each of the strata using Neyman Allocation?

8. You have a 75 acre stand that you put 26 1/10 acre plots on. The plots gave you a mean Vol/Acre of 800 cu ft and a SD of 105 cu ft/Acre. If you sell the stand for $320 / mbf, with 95% certainty what is the maximum gross value you would expect to receive?

9. For the stand in question #8 you expect it to cost you $80 / mbf to transport from your landing to the mill, with 95% certainty what is the maximum net profit you would expect?

10. What would be the maximum net profit in question #9 if we operated under a 90% certainty?

11. From the attached dataset, calculate the average QMD, TPA, and cubic foot volume per acre for the $1/20^{th}$ acre plot inventory. (tree volume ft^3 = BA * 0.65 + Height * 0.8)

12. If the stand in question #11 was 96 acres and you can sell the PSME and TSHE to the same mill for $\$21/ft^3$ and the THPL to another mill for $\$27/ft^3$, to 90% certainty, what is the range of the stands value?(Be sure to account for the species composition.)

13. Estimate the total volume (cu ft) and standard error (cu ft) for the PPP cruise data in the attached sheet.

14. Using the parameters calculated in problem #13 and α=0.05 what is the maximum and minimum amount you could receive in a logging sale if you received $320/mbf and the stand was 40 acres? If it cost you $50/mbf to haul the logs to the mill, what is your total hauling cost and how much do you make?