MAT 450 Finite Sampling
Exam 3

Name: _____

You must show the steps to receive the full credits!

1. The following table gives population values for a small population of clusters. Now, you wish

psu	M_i	y_{ij}	t_i
1	5	3,5,4,6,2	20
2	4	7,4,7,7	25
3	8	7,2,9,4,5,3,2,6	38
4	5	2,5,3,6,8	24

to select two psus with probabilities of inclusion proportional to M_i.

a) Assume you have selected psus $\{1, 3\}$ by Lahiri's method. Estimate the population mean. (5 points)

b) Construct 95% C.I. for the population mean in a). (10 points)

c) Now, suppose we have selected psus $\{1, 3\}$ by Lahiri's method, and subsample observations from in each psu rather than all the observations. Estimate the population mean and construct 95% C.I. (10 points).

psu	M_i	y_{ij}
1	5	3,5
3	8	7,2,9,4

d) Now assume that the observations $\{3, 5, 7, 2, 9, 4\}$ are SRS. Compare the variance to that in c), and explain your findings. (10 points)

e) Estimate the population total using psus $\{1, 3\}$ based on Horvitz-Thompson (HT) estimate, and construct 95% C.I if applicable. (10 points).