Stat 576 review of topics for midterm

SRSWR and SRSWOR: be able to estimate the population mean, population total, or population proportion, and find the standard error of the estimate.

Find confidence intervals for the population mean, total, or proportion, including sample size determinations

Find ratio, difference, and regression estimators and their standard errors

Find estimators and their standard errors in the case of post-stratification

Stratified sampling: find optimal, Neyman, proportional, or equal allocation of the sample, and find the optimal demarcation of a population using the Dalenius-Hodges rule.

Cluster sampling: this topic will appear on the final exam, not on the midterm

Name: _____

Practice problems

Stat 576 **Fall 2017** **November 2**

1. In a sample of 6 households from a neighborhood of 100 households, we find:

# of people	# of TVs
3	2
5	2
2	1
6	3
4	2
4	2

   a) Find a 95% confidence interval for the average number of TVs per household in the neighborhood.

   b) Find a 95% confidence interval for the average number of TVs per person in the neighborhood.

2. In a sample of 25 people, we find 10 males and 15 females. They are asked to rate a product on a scale of 1 to 10. The males have an average GPA of 3.4 with a standard deviation of 0.0. The females gave an average and standard deviation of 3.6 and 0.8. Estimate the mean GPA in the population, and give the standard error of your estimate.

3. Consider the frequency distribution on the next page, showing incomes in thousands of dollars (the first category is $10,000 to $11,999, for example). We decide to estimate the total population income by using 3 strata and a sample size of 100 people.

   a) What are the optimal stratum boundaries?

   b) Using the optimal stratum boundaries, allocate the sample of 100 people, using Neyman allocation.

   c) Using the optimal stratum boundaries, allocate the sample of 100 people, using proportional allocation.

	f	$\sqrt{f}$	Cum f	Cum $\sqrt{f}$
10 –	205	14.3	205	14.3
12 –	135	11.6	340	25.9
14 –	106	10.3	446	36.2
16 –	82	9.1	528	45.3
18 –	61	7.8	589	53.1
20 –	42	6.5	631	59.6
22 –	32	5.7	663	65.3
24 –	30	5.5	693	70.8
26 –	27	5.2	720	76.0
28 –	18	4.2	738	80.2
30 –	22	4.7	760	84.9
32 –	21	4.6	781	89.5
34 –	19	4.4	800	93.9
36 –	16	4.0	816	97.9
38 –	14	3.7	830	101.6
40 –	17	4.1	847	105.7
42 –	9	3.0	856	108.7
44 –	8	2.8	864	111.5
46 –	11	3.3	875	114.8
48 –	9	3.0	884	117.8
50 –	7	2.6	891	120.4
52 –	4	2.0	895	122.4
54 –	5	2.2	900	124.6
56 –	5	2.2	905	126.8
58 –	6	2.4	911	129.2
Totals	911	129.2		