

1. A hypothetical population is given in the table below. Consider stratified sampling with SRSs of size $n_1 = n_2 = 3$ taken from the two strata, respectively.

Stratum 1		Stratum 2	
Unit	y	Unit	y
1	1	5	5
2	4	6	6
3	4	7	9
4	5	8	11

- (a) (1pt) What are the values of \bar{y}_{1U} and \bar{y}_{2U} ?
 - (b) (1pt) What are the values of S_1^2 and S_2^2 ?
 - (c) (1pt) What are the values of $V(\hat{t}_1)$ and $V(\hat{t}_2)$?
 - (d) (1pt) What are the values of $V(\hat{t}_{str})$ and $V(\hat{y}_{Ustr})$?
 - (e) (2.5pt) Write out all possible stratified SRSs (with $n_1 = n_2 = 3$), and for each stratified sample, calculate \hat{t} .
 - (f) (1pt) What is the sampling distribution of \hat{t} ? That is, list all possible values of \hat{t} and their associated probabilities.
 - (g) (1pt) Use the sampling distribution of \hat{t} to verify that \hat{t} is an unbiased estimator of t .
2. (2.5pt) Exercise 6(a), page 103. Use the optimum allocation formulas using $S_1 = 2S_2$ and $S_3 = S_2$. That is, replace S_1 with $2S_2$ and S_3 with S_2 , and simplify.
 3. (3pt) Exercise 11 (a), page 105. Also, include a 95% confidence interval and its interpretation in the context of the problem. The *seals.dat* file will be mailed to you and posted on the webpage.
 4. (1.5pt) Exercise 12, page 106.
 5. (3.5pt) Exercise 16(a), page 107. Also, include a 95% confidence interval and its interpretation in the context of the problem. The *otters.dat* file will be mailed to you and posted on the webpage.
 6. (2pt) For Stat Graduate Students: Exercise 21, p. 110. You are to work alone on this problem with no discussion with other students.