

STA 304H1F-1003H Winter 2020

Assignment 2-Question 1

Question 1. (15 marks)

Consider a population of 6 student given in the table below. We want to select a stratified sampling of size 4 with a SRS of size 2 taken from each of the two strata.

stratum 1			
Student	1	2	3
Score	66	59	70

stratum 2			
Student	4	5	6
Score	83	82	71

- (a) (2 marks) Find the values of μ_1 and μ_2 ?
- (b) (2 marks) Find the values of σ_1^2 and σ_2^2 ?
- (c) (2 marks) What are the values of $\mathbf{V}(\hat{\tau}_1)$ and $\mathbf{V}(\hat{\tau}_2)$?
- (d) (2 marks) What are the values of $\mathbf{V}(\hat{\tau}_{str})$ and $\mathbf{V}(\hat{\mu}_{str})$?
e.g. $\hat{\tau}_{str}$ means the estimate of τ from stratified RS.
- (e) (3 marks) How many stratified random samples (RSs) are possible? List the possible stratified RSs.
- (f) (2 marks) For each stratified sample, calculate $\hat{\mu}$ and $\hat{\tau}$.
- (g) (2 marks) Use the sampling distribution of $\hat{\mu}$ and $\hat{\tau}$ to verify that $\hat{\mu}$ and $\hat{\tau}$ are an unbiased estimator of μ and τ .