STA 304H1F-1003H Fall 2019
Assignment 2-Question 1

Question 1. (15 marks)

Consider a hypothetical population 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				
Unit	1	2	3	4
y	1	4	4	5

stratum 2				
Unit	5	6	7	8
y	5	6	9	11

(a) (2 marks) What are the values of μ_1 and μ_2?

(b) (2 marks) What are the values of σ_1^2 and σ_2^2?

(c) (2 marks) What are the values of $\mathbf{V}(\widehat{\tau}_1)$ and $\mathbf{V}(\widehat{\tau}_2)$?

(d) (2 marks) What are the values of $\mathbf{V}(\widehat{\tau}_{str})$ and $\mathbf{V}(\widehat{\mu}_{str})$?

(e) (3 marks) Write out all possible stratified SRSs, and for each stratified sample, calculate $\widehat{\mu}$ and $\widehat{\tau}$.

(f) (2 marks) Write out all possible stratified SRSs, and for each stratified sample, calculate $\widehat{\mu}$ and $\widehat{\tau}$.

(g) (2 marks) Use the sampling distribution of $\widehat{\mu}$ and $\widehat{\tau}$ to verify that $\widehat{\mu}$ and $\widehat{\tau}$ are an unbiased estimator of μ and τ.