

# STA 304H1F-1003H Wnter 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  $\mu_1$  and  $\mu_2$ ?
- (b) (2 marks) Find the values of  $\sigma_1^2$  and  $\sigma_2^2$ ?
- (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  $\tau$  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  $\mu$  and  $\tau$ .