The population consists of units with values 1, 2, 3, 4, 5 and 6. Draw all possible samples of size two using simple random sampling with replacement and simple random sampling without replacement. Prove that

1. Sample mean is unbiased estimate of population mean
2. Sample variance is on by estimate of population variance for simple random sampling with replacement
3. Sample mean square is unbiased of population mean square for simple random sampling without replacement.
4. Prove that for SRSWOR
5. Prove that for SRSWR
6. Also find the standard error of estimates for both cases.

Working expression:

Population mean

Population variance

Population mean square

Sample mean

Sample mean square sample variance

No of samples of size n from population of size N

For SRSWOR

For SRSWR