

Worksheet 2

Sometimes we may need to choose between two sampling plans by comparing measures such as variance, bias and accuracy. Here we are interested in estimating μ , the population mean.

For purposes of studying sampling distributions, assume that all population values are known: $y_1 = 98, y_2 = 109, y_3 = 154, y_4 = 133, y_5 = 190, y_6 = 175$. Out of the $N = 6$ total possible values to sample from, we will choose $n = 3$.

Plan 1: The following eight possible samples may be chosen with equal probability: $\{1,3,5\}$, $\{1,3,6\}$, $\{1,4,5\}$, $\{1,4,6\}$, $\{2,3,5\}$, $\{2,3,6\}$, $\{2,4,5\}$, $\{2,4,6\}$

Plan 2: The following three samples may be chosen: $\{1,4,6\}$, $\{2,3,6\}$, $\{1,3,5\}$ with respective probabilities $\delta = (.25, .5, .25)$.

Answer the following questions:

- a) What is the value of μ ?
- b) For each sampling plan, find: i) $E[\bar{y}]$, ii) $V[\bar{y}]$, iii) $\text{Bias}(\bar{y})$, iv) $MSE(\bar{y})$, where \bar{y} is the mean of sample values.
- c) Which sampling plan do you think is better, and why?