If $X_1, \ldots, X_n$ random sample

WITHOUT REPLACEMENT

from $\{y_1, \ldots, y_N\}$

$$E(\bar{X}) = \bar{y} = \mu$$

$$\sigma^2 = \frac{1}{N}\sum_{j=1}^{N}(y_j - \bar{y})^2$$

$$\text{Var}(\bar{X}) = \frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)$$

NOT EXAMINABLE!!

$$\approx \frac{\sigma^2}{n}\left(\frac{N-n}{N}\right) = \frac{\sigma^2}{n}\left(1 - \frac{n}{N}\right)$$