From a population of 20,000 observations, a sample of 500 observations is selected. Calculate the standard error of sample mean if the population standard deviation equals 20

Solution

The standard error of sample mean for finite populations is

$$\sigma_{\bar{X}} = \frac{\sigma}{n} \cdot f_{pc},$$

where σ is the population standard deviation, n is a sample size, $f_{pc} = \sqrt{\frac{N-n}{N-1}}$ is the finite population correction factor, N is population size.

Thus, the standard error of sample mean is

$$\sigma_{\bar{X}} = \frac{20}{500} \cdot \sqrt{\frac{20000 - 500}{20000 - 1}} = 0.039.$$

Answer: 0.039.