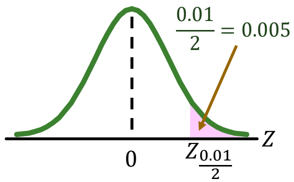
Confidence Interval for μ (σ Known) – Exercise

Cont'd

Since the population number of shares traded (X) follows Normal distribution, the distribution of sample means also follows Normal distribution, i.e. $\bar{X} \sim N(\mu_{\bar{X}}, (\frac{\sigma}{\sqrt{n}})^2)$

With known population standard deviation (σ), Z distribution is used



99% confidence interval (C.I.) for μ

$$\bar{X} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}} = 215000 \pm Z_{0.01/2} \frac{195000}{\sqrt{15}}$$

$$= 215000 \pm 2.575 \frac{195000}{\sqrt{15}} = [85351.88, 344648.12]$$

Confidence Interval for μ (σ Unknown) – Exercise

Cont'd

Let X be the amount spent in the store and $\bar{X}$ be the sample mean amount spent

The samples are drawn from an unknown distribution, but at a large size n = 200, by CLT $\bar{X}$ follows normal distribution approximately, but σ is unknown, and t distribution is used

95% confidence interval (C.I.) for μ

$$\bar{X} \pm t_{\alpha/2, n-1} \frac{S}{\sqrt{n}} = 21.34 \pm 1.96 \frac{9.22}{\sqrt{200}}$$

$$= [20.0622, 22.6179]$$

We are 95% confident that the population mean amount spent is between \$20.0622 and \$22.6179

Determining Sample Size – Exercise

Cont'd

2. If we want to increase our confidence to 95%, how many individuals should we interview? Keep all other factors remain unchanged.

$$n = (\frac{Z_{\alpha/2}\sigma}{E})^2 = (\frac{1.96 \times 28.84}{2.5})^2 = 511.24 \cong 512$$