

Assignment-3

- Q In the Quant test of CAT exam the population Standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct a 95% CI about

$$\downarrow$$

$$\boxed{1.80} \%$$

$$\Rightarrow \sigma = 100, n = 25, \bar{x} = 520 \quad CI = 95, CI = 80$$

$$\begin{aligned} \alpha &= \text{Significant} = 1 - CI \\ &= 1 - 95\% \\ \alpha &= \underline{\underline{0.05}} \end{aligned}$$

$$\begin{aligned} \alpha &= 1 - CI \\ &= 1 - 80\% \\ \alpha &= \underline{\underline{0.2}} \end{aligned}$$

Point Estimate \pm margin of error

Point Estimate \pm margin

$$\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \Rightarrow$$

$$\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= \frac{z_{0.05}}{2} \quad z = 0.025$$

$$z = \frac{0.2}{2} = z = 0.1$$

$$= 1 - 0.025$$

$$= 0.975$$

$$= 1 - 0.1$$

$$= 0.9$$

$$z_{\text{table}} = \frac{1.96}{2}$$

$$z_{\text{table}} = 1.29$$

$$\text{Lower Fence} = \bar{x} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \quad \text{Lower Fence}$$

$$\begin{aligned} &520 - 1.96 \frac{100}{\sqrt{25}} \\ &= 480.8 \end{aligned}$$

$$\text{Higher Fence} = \bar{x} + Z_{22} \frac{\sigma}{\sqrt{n}} = 520 - 1.29 \frac{100}{\sqrt{25}}$$

$$= 520 + 1.96 \times 20$$

$$= 559.2$$

$$= 520 - 1.29 \frac{100}{\sqrt{25}}$$

$$= 520 - 25.8$$

$$= \underline{\underline{494.2}}$$

* Higher Fence = $\bar{x} + Z_{22} \frac{\sigma}{\sqrt{n}}$

$$= 520 + 1.29 \frac{100}{\sqrt{25}}$$

$$= 520 + 25.8$$

$$= 545.8$$

100k Employees, 500 data, 300 xl, 200

CI \rightarrow 95

$\Rightarrow \sigma = 100k$ $\bar{x} = 300$ $n = 500$

* Significance = $1 - CI$
 $= 1 - 95$
 $= 0.05$

\Rightarrow Point Estimate \pm margin of error

$$\bar{x} \pm Z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$$

$$Z = \frac{0.05}{2} = 0.025$$

$$= 1 - 0.025$$

$$= 0.975$$

$$Z_{table} = 1.96$$

$$\text{Lower Fence} = \bar{x} - Z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$$

$$= 300 - 1.96 \frac{100,000}{\sqrt{500}}$$

$$= 300 - 1.96 \frac{100,000}{22.360}$$

$$= 300 - 1.96 * 4472.27$$

$$= 300 - 8765.64$$

$$\text{Lower Fence} = -8465.64$$

$$\text{Higher Fence} = \bar{x} + Z \frac{\sigma}{\sqrt{n}}$$

$$= 300 + 1.96 \frac{100,000}{\sqrt{500}}$$

$$\text{Higher fence} = \underline{9065.64}$$

$$\star \quad \sigma = 100k \quad \bar{x} = 200 \quad n = 500$$

$$\begin{aligned} \Rightarrow \text{Significance} &= 1 - CI \\ &= 1 - 95 \\ &= 0.05 \end{aligned}$$

→ Point Estimate ± margin of error

$$\bar{x} \pm Z \frac{\sigma}{\sqrt{n}}$$

$$Z = 0.025$$

$$Z = 0.975$$

$$\underline{Z_{table} = 1.96}$$

$$\text{Lower Fence} = \bar{x} - Z \frac{\sigma}{\sqrt{n}}$$

$$= 200 - 1.96 \frac{100000}{\sqrt{500}}$$

$$= 200 - 8765.64$$

$$\text{Lower} = -8565.64$$

$$\text{Higher Fence} = \mu + Z_{\alpha} \frac{\sigma}{\sqrt{n}}$$

$$= 200 + 1.96 \frac{100000}{\sqrt{25}}$$

$$= 8965.64$$